

FIFTY-FOURTH ANNUAL REPORT  
OF THE  
DEPARTMENT OF MARINE  
AND FISHERIES

FOR THE  
FISCAL YEAR 1920-21

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MARINE

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OTTAWA  
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1922







*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B., G.C.M.G., M.V.O., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the Fifty-fourth Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,  
*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE,  
OTTAWA, November, 1921.







# TABLE OF CONTENTS

REPORT SUBMITTED BY MINISTER.

REPORT OF DEPUTY MINISTER. Subjects paged in summary below.

## A

	PAGE
America's Merchant Marine.....	9, 10
Australian Shipbuilding Programme, 1920-21.....	14, 15
Agency reports.....	83-88
Halifax agency .....	83
Pictou, N.S., sub-agency.....	83
Sydney, N.S., sub-agency.....	84
Charlottetown, P.E.I., agency.....	84
Quebec agency.....	84, 85
Victoria, B.C., agency.....	85
Prince Rupert, B.C., agency.....	85
Fort William, Ont., sub-agency.....	85, 86
Kenora, Ont., sub-agency.....	86
Parry Sound, Ont., agency.....	86
Prescott Depot agency.....	86, 87
Montreal agency.....	87
St. John, N.B., agency.....	87, 88

## B

British Dominions mercantile shipbuilding, 1920.....	4
--	---

## C

Comparative costs of shipbuilding and ship operating in Britain, pre-war and 1920....	6
Canadian Ports, marine activities.....	12
Canadian Government shipbuilding programme.....	13, 14
Canadian shipbuilding plants, operations of.....	15-17
Canadian Vickers, Ltd.....	16
Collingwood Shipbuilding Co., Ltd.....	17
Coughlan & Sons, Ltd.....	17
Canadian Shipping, Statistics of.....	18-23
Chief Engineer's report on—	
Office work.....	24
Publications .....	24
Removal of obstructions to navigation.....	24
Maintenance and repairs to wharves.....	24, 25
Ice-breaking .....	25
New aids to navigation—	
Nova Scotia.....	25
New Brunswick.....	25
Prince Edward Island.....	26
Quebec .....	26
Montreal district.....	27
Ontario .....	27
Victoria .....	27
Prince Rupert.....	28
Changes and Improvements in existing aids—	
Nova Scotia.....	25
New Brunswick.....	25, 26
Prince Edward Island.....	26
Quebec .....	26
Montreal district.....	27
Ontario .....	27
Victoria .....	27
Prince Rupert.....	28
Commissioner of Lights' Report—	
Statement by districts showing the number of lights of the several orders, lightships, light-boats, light-keepers, fog signals, buoys, submarine bells, etc.....	28
Statement of unlighted aids to navigation maintained in—	
New Brunswick district.....	29
Nova Scotia district.....	29, 30
Prince Edward Island district.....	30, 31
Quebec district.....	31, 32



Commissioner of Lights' Report—*Con.*Statement of unlighted aids to navigation maintained in—*Con.*

Montreal district.....	32
Prescott district.....	32
Parry Sound district.....	32, 33
Kenora district.....	33
Manitoba district.....	33
Victoria district.....	33
Prescott district.....	33
Charlottetown, P.E.I., agency report.....	84
Correspondence .....	102

## D

Davie Shipbuilding and Repairing Co., Ltd.....	15
--	----

## E

Expenditure and Revenue, Marine Department, 1920-21.....	49, 50, 102
--	-------------

## F

Fort William, sub-agency report.....	85, 86
France, mercantile shipbuilding, 1920.....	5
Fuel Oil supply, world's.....	8

## G

General review, mercantile shipbuilding, 1920.....	5
--	---

## H

Halifax Shipyards, Ltd.....	17
Halifax agency report.....	83
Harbour Commissioners, reports.....	89-98
Quebec .....	89-91
Three Rivers.....	91, 92
Vancouver .....	92, 94
Pictou .....	95
Montreal .....	95, 98
Holland, mercantile shipbuilding, 1920.....	4

## I

Italy, mercantile shipbuilding, 1920.....	4, 5
---	------

## J

Japan, mercantile shipbuilding, 1920.....	4
Jones Shipping Act.....	10, 11

## K

Kenora sub-agency report.....	86
-------------------------------	----

## L

Lloyds shipbuilding returns of merchant vessels (steam and sail) under construction for quarter ended June 30, 1920.....	1
Lloyds statement of steam tonnage of chief maritime countries before and after the war..	2
Lloyds mercantile shipbuilding, 1920.....	3-5
Lloyds statement world output merchant vessels, 1920.....	5
Lloyds statement, comparative costs, shipbuilding and ship operating in Britain pre-war and 1920.....	6
Lloyds statement, percentage cost of running, 1920, compared with 1914.....	6
Legislation, new.....	103

## M

Mercantile shipbuilding, 1920, Lloyds statement.....	3-5
Merchant marine, America's.....	9, 10
Marine activities, Canadian ports.....	12
Midland Shipbuilding Co., Ltd.....	15



## SESSIONAL PAPER No. 21

	PAGE
Meteorological Service, Report of Director.....	50-62
New stations.....	50, 51
Central office.....	51, 52
Physics Branch.....	52
Climatology, etc.....	53
Magnetic observations.....	53-55
Time service.....	55, 56
Solar observations.....	56
Seismological observations.....	56, 57
Phenological observations.....	57
Quebec Observatory—report of Director.....	57
St. John Observatory—report of Director.....	57-59
Victoria, B.C. Observatory—report of Director.....	59, 60
McGill University Observatory—report of Director.....	60-62
Masters and Seamen Branch—Report of Superintendent.....	81
Montreal Agency report.....	87
Montreal Harbour Commission report.....	95-98
Marine Department, correspondence.....	102

## N

Nova Scotia Steel and Coal Co., Ltd.....	16
New Legislation.....	103
Navigation, season of.....	103

## O

Oil versus Coal as ships fuel.....	6-8
Operations, Canadian Shipbuilding plants.....	15-17

## P

Percentage cost of running, 1920, compared with with 1914, Lloyds statement.....	6
Port Arthur Shipbuilding Co., Ltd.....	16
Pilotage—report of Superintendent.....	81, 82
Pictou sub-agency report.....	83
Prince Rupert agency report.....	85
Parry Sound agency report.....	86
Prescott depot, Ont., report.....	86, 87
Port Wardens reports.....	88, 89
Pictou Harbour commission report.....	95
Pacific Salvage Co., Ltd., report.....	99

## Q

Quebec agency report.....	84, 85
Quebec Harbour Commission report.....	89-91
Quebec Salvage and Wrecking Co., report.....	99

## R

Revenue and Expenditure.....	49, 50, 102
Reports, Port Wardens.....	88, 89
Returns of Shipping Masters.....	100-102
Quebec.....	100
New Brunswick.....	100
Nova Scotia.....	100, 101
Prince Edward Island.....	101
British Columbia.....	102

## S

Shipbuilding returns of merchant vessels (steam and sail) under construction for the quarter ended June 30, 1920, Lloyds statement.....	1
Steam tonnage of principal maritime countries before and after the war, Lloyds statement.....	2
Scandinavian countries, mercantile shipbuilding, 1920.....	4
Spain, mercantile shipbuilding, 1920.....	5
Summary mercantile shipbuilding, 1920.....	5
Ships fuel, oil versus coal.....	6-8
Shipping Act, Jones.....	10, 11
Shipbuilding Programme, Canadian Government.....	13, 14
Shipbuilding Programme, Australian, 1920-21.....	14, 15
Shipbuilding plants, operations of.....	15-17
Shipping, Canadian statistics of.....	18-23



	PAGE
Statement of vessels built in Canada and registered, 1920.....	18
Statement of vessels built in Canada in 1920, and exported without being registered... ..	18
Statement of number of vessels and number of tons on Registry books of the Dominion of Canada, on December 31, 1920.....	19, 20
Statement of number of vessels removed from registry books of the Dominion of Canada during year ended December 31, 1920.....	21
Statement of number of men and boys employed on ships registered in Canada, 1920... ..	21
Statement, comparative, showing the number of vessels and number of net tons on the registry books of the Dominion of Canada, on December 31, in each year, from 1911 to 1920, inclusive.....	22
Statement, comparative, of vessels built and registered in the Dominion of Canada and their net tonnage during the year ended December 31, in each year 1911 to 1920, inclusive .....	23
St. Lawrence River Ship Channel, report of Superintending Engineer.....	34-47
General information.....	34
Dredging operations, 1920.....	34, 35
Division I (Montreal to Sorel).....	34, 35
Division II (Sorel to Batiscau).....	35
Division III (Lake St. Peter).....	35
Division IV (Batiscau to Quebec).....	35
Division V (Quebec to Goose Cape).....	35
Thirty-foot project, end of 1920.....	36
Thirty-five-foot project, end of 1920.....	36
Depth of water in ship channel, 1920.....	36
Tidal semaphores.....	36
Sweeping ship channel.....	36
New aids, season 1920.....	37
Accidents in 1920.....	37, 38
Marine signal service.....	38, 39
Improvements in signal service.....	40
Ice-breaking .....	40, 41
Average monthly depth in 27½ foot channel O.L.W.....	41
Average monthly depth in 30 foot channel E.L.W. (1897).....	41
Cost of ship channel to date.....	42
Progress of dredging operations, 30 foot project.....	42, 43
Progress of dredging operations, 35 foot project.....	43, 44
Abstract of work of dredging fleet.....	45
Classification of disbursements.....	46
Details of dredging and cost per cubic yard.....	47
Sorel Shipyard, report of officer-in-charge.....	48
Signal Station, Halifax, N.S., record of shipping.....	82
Sable Island, report of Superintendent.....	82
Sydney, N.S. sub-agency report.....	84
St. John, N.B., agency report.....	87, 88
Season of navigation.....	102
Steamboat inspection.....	103

## T

Tidewater Shipbuilders, Ltd.....	17
Three Rivers Harbour Commission report.....	91, 92

## U

United Kingdom, mercantile shipbuilding, 1920, Lloyds statement.....	3
United States, mercantile shipbuilding, 1920, Lloyds statement.....	3, 4

## V

Victoria, B.C., agency report.....	85
Vancouver Harbour Commission report.....	92-94

## W

World output of merchant vessels, 1920, Lloyds statement.....	5, 6
World's fuel oil supply.....	8
Wallace Shipbuilding and Drydock Co., Ltd.....	15
Wreck Commissioner's Report.....	62-80
Statement of investigations into wrecks and casualties.....	62-66
Statement of coasting and sea-going wrecks.....	67-77
Statement of inland waters wrecks.....	78-80
Wrecking Companies reports.....	99

## Y

Yarrows, Limited.....	15, 16
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# REPORT

OF THE

## DEPUTY MINISTER OF MARINE AND FISHERIES

TO THE HONOURABLE C. C. BALLANTYNE,  
Minister of Marine and Fisheries.

Sir,—I have the honour to submit herewith my report for the fiscal year ended March 31, 1921.

The chief feature of the shipping situation in 1919 was the remarkable output of tonnage from American yards, which actually exceeded 4,000,000, and amounted to 57 per cent of the world's entire output for that year. The British output for 1919 was 1,620,442 tons; America accordingly, for the time being, and by a wide margin, occupied the foremost place among shipbuilding nations.

At the same time it was pointed out in last year's report that America was apparently not in a position to maintain this tremendous rate of building; for though her output for 1919 exceeded 4,000,000 tons, her shipping in hand at the beginning of 1920 fell just short of 3,000,000 tons, Britain's programme at the same time being almost identical, there being a difference of only 2,000 tons in favour of America.

It was surmised that 1920 might see Britain again asserting her ancient supremacy as the leading shipbuilding nation. Lloyds returns herewith given would seem to bear this out.

LLOYDS REGISTER SHIPBUILDING RETURNS OF MERCHANT VESSELS (STEAM AND SAIL) UNDER CONSTRUCTION  
FOR THE QUARTER ENDED JUNE 30, 1920.

Date.	Country.	No. of ships under construction.	Gross tons.
June 30, 1920.....	United Kingdom.....	941	3,578,153
June 30, 1920.....	Canada.....	84	209,405
June 30, 1920.....	Other Dominions.....	31	59,394
	Total for the Empire.....	1,056	3,846,952
June 30, 1920.....	United States.....	414	2,105,956

In the rest of the world there were under construction on June 30, 1920, 725 ships, totalling 1,767,996 gross tons.

The Empire's total tonnage nearly equals the high-water mark of building reached by America at the end of March, 1919, when she had in hand 4,185,523 tons of ship-ping.

The true significance of these returns becomes more marked if we go back to the period of April 1, 1919. At that time the United States' shipbuilding programme was 4,185,523 tons; Britain's, 2,254,845 tons. In the space of fifteen months the figures have been almost reversed, and American production cut in half.



12 GEORGE V, A. 1922

Lloyds points out that the great stimulus given to British shipbuilding during this momentous period was largely due to work on the Clyde. Of the United Kingdom tonnage, 3,578,153, the Clyde yards had in hand 1,260,777 tons, which was more than one-third of the United Kingdom total, and 208,000 tons more than half the American tonnage in prospect. Tonnage in hand in other Scottish yards amounted to: Aberdeen, 119,743 tons; Dundee, 62,380; Leith, 65,458; a total for Scotland of 1,508,358 tons, only 280,718 tons short of one-half the entire United Kingdom tonnage under construction on June 30, 1920.

An encouraging feature of the revival of the British shipbuilding industry since the armistice, has been the steady and persistent nature of its growth.

At the time of the armistice, November, 1918, Britain had under construction 1,746,993 tons of shipping; in March, 1919, she had over 2,000,000 tons; in March, 1920, 3,000,000 tons; and on June 30, 1920, 3,578,153 tons.

LLOYDS STATEMENT OF THE STEAM TONNAGE OWNED BY THE PRINCIPAL MARITIME COUNTRIES BEFORE AND AFTER THE WAR.

Country.	June, 1914.	June, 1920.	Difference between 1914 and 1920.
	Tons, gross.	Tons, gross.	Tons, gross.
United Kingdom.....	18,892,000	18,111,000	-781,000
British Dominions.....	1,632,000	2,032,000	+400,000
America (United States)—			
Seagoing.....	2,027,000	12,406,000	+10,379,000
Great Lakes.....	2,260,000	2,119,000	-141,000
Austria-Hungary.....	1,052,000	Nil.	
Denmark.....	770,000	719,000	-51,000
France.....	1,922,000	2,963,000	+1,041,000
Germany.....	5,135,000	419,000	-4,716,000
Greece.....	821,000	497,000	-324,000
Holland.....	1,472,000	1,773,000	+301,000
Italy.....	1,430,000	2,118,000	+688,000
Japan.....	1,708,000	2,996,000	+1,288,000
Norway.....	1,957,000	1,980,000	+23,000
Spain.....	884,000	937,000	+53,000
Sweden.....	1,015,000	996,000	-19,000

It will be seen in comparing June, 1914, with June, 1920, that British tonnage had decreased by 781,000 tons, that of the Dominions increasing by 400,000, leaving a deficit of only 381,000 tons for the British Empire for 1920 as compared with 1914.

Besides new construction the 1920 figures for Britain and the Dominions also include ex-enemy tonnage allocated to British management.

In the space of about eighteen months after the close of war, despite the enormous losses inflicted on its merchant marine, the Empire had practically regained its pre-war maritime strength.

America shows an increase of sea-going tonnage of 10,379,000, Japan of 1,288,000, France of 1,041,000 (largely by purchase and allocation of ex-enemy tonnage), Italy of 688,000 (largely by purchase and allocation of ex-enemy tonnage), and Holland of 301,000.

The tonnage of Austria-Hungary has been wiped out, and German tonnage has dropped from the five million mark to less than half a million.

Among the allied countries Greece after Great Britain shows the heaviest decline, 324,000 tons. Danish tonnage has dropped by 51,000, and Swedish by 19,000.

Spanish tonnage shows an increase of 53,000, and Norwegian, despite terrific submarine losses, of 23,000.

World's shipping was increased by 8,501,000 tons.



## SESSIONAL PAPER No. 21

## MERCANTILE SHIPBUILDING, 1920.

The returns here given are from Lloyds Register's Annual Summary, are in gross tons, and comprise only merchant ships of 100 gross tons or upwards.

As complete totals for German shipbuilding are not available, Germany has been omitted from the returns.

## UNITED KINGDOM

During 1920 there were launched in the United Kingdom 618 merchant ships of 2,055,624 tons (viz: 556 steamers of 1,953,014 tons, 25 motor vessels of 86,940 tons, and 37 sailing vessels and barges of 15,670 tons).

These vessels were all built of steel with the exception of three wooden vessels of 660 tons, and seven vessels of reinforced concrete of 3,794 tons.

As the output in 1919 was 1,620,442 tons, the 1920 output exceeds it by 435,182 tons, about 26 per cent more. The 1920 output is also higher by 142,371 tons than the high record of 1913.

Whereas in 1919, 94 per cent of the output was for home registration and only 6 per cent for foreign owners; in 1920 about 41 per cent (846,403 tons) was for owners abroad, and 1,209,221 tons for registration in the United Kingdom.

Of the 1920 tonnage on foreign account, 286,644 tons were for Norwegian owners, 201,662 for French owners, and 131,589 for Italian owners.

The average tonnage of ships launched, excluding those of less than 500 tons, was 4,387 tons, as compared with 4,006 in 1919, 4,593 in 1918, 4,933 in 1917, 4,080 in 1916, and 3,791 in 1915.

During the year 25 motor-boats of 86,940 tons were launched, 11 of these were of 5,000 tons and upwards, and the 3 largest of 9,500 tons.

As in 1919, the Clyde basin yards were responsible for the greatest part of the United Kingdom output. Glasgow district 457,032 tons, Greenock 223,434 tons, a total of 680,466 tons for the Clyde basin, an increase of 154,719 tons over the 1919 production; Newcastle 365,775 tons, an increase of 125,939 tons as compared with 1919; Sunderland 314,454 tons, 40,171 tons more than in 1919; Middlesbrough 195,452 tons, 75,509 tons more than in 1919; and Belfast 117,656 tons, 82,964 tons less than in 1919.

At the beginning of 1920, 2,994,249 tons of shipping were under construction in the United Kingdom; at the end of September, 1920, 3,731,098 tons; at the beginning of 1921, 3,708,916 tons; the drop of 22,000 tons, though slight, indicates a decline in the British shipbuilding industry, and Lloyds is of the opinion that the shipbuilding figures at the beginning of 1921, though still high, are not a true indication of the shipbuilding situation in Britain in the near future, which is due for a decline.

## UNITED STATES

American output for 1920 amounted to 2,476,253 tons, 1,599,132 tons less than in 1919, accounting for 92 per cent of the reduction in the total world tonnage launched in 1920.

On the Atlantic coast the tonnage output was reduced by 17.3 per cent as compared with 1919, on the Gulf coast by 31.6 per cent, on the Pacific coast by 60 per cent, and on the Great Lakes by 74 per cent.

Despite this reduction in output the 1920 figures were five and a quarter times more than the 1907 figures, the pre-war record year, and accounted for 42 per cent of the world's output for 1920, and 65 per cent of the total built abroad.

On the Great Lakes 127,528 tons of shipping were launched, including 4 steamers, totalling 33,222 tons for lake service.

Of the total 1920 tonnage, 1,500,000 tons of vessels were fitted with steam turbines, and 29,000 tons of vessels with internal combustion engines of the Diesel type.



12 GEORGE V, A. 1922

Eighty-eight oil-carrying steamers, tonnage 567,000, were launched; 73 of which of 510,000 tons were built on the Isherwood system of longitudinal framing; about 85 other vessels, totalling about 558,000 tons, were also built on this system, a total of 1,068,000, or a little less than half the American output for 1920.

The American tonnage comprised 119 steamers of between 5,000 and 6,000 tons, 152 of between 6,000 and 10,000 tons, and 15 of 10,000 tons and upwards. Seven turbine steamers of about 13,500 tons each were launched; five by the New York Shipbuilding Corporation, and two by the Newport News Shipbuilding and Drydock Company.

The returns include five vessels of reinforced concrete of 19,000 tons, one of 6,000 tons burden, and two of 5,000 tons.

## JAPAN

Japan's output of 456,642 tons was 155,241 tons less than in 1919. It formed 34½ per cent of the total tonnage launched abroad exclusive of the United States, and nearly equals the entire output of Japan during the ten pre-war years 1904-1913.

Japan's total for 1920 only includes steel steamers, of which 30 were between 5,000 and 6,000 tons each and 21 between 6,000 and 10,000 tons each.

## BRITISH DOMINIONS

The Dominions' output for 1920 was 155,000 tons less than in 1919, amounting to 203,644 tons.

Canada contributed 159,551 tons, about 112,000 tons less than in 1919. On the Great Lakes were launched 13 steel steamers of 29,087 tons. On the Atlantic and Pacific coasts and the St. Lawrence 17 steel steamers of between 5,000 and 6,000 tons each were launched.

Tonnage launched in the other Dominions amounted to 44,093 tons; one-half of this was in the Hong-Kong district, where two ships of 5,100 tons each were built.

## HOLLAND

Holland increased her 1919 tonnage output by 46,000 tons, the total 1920 tonnage amounting to 183,149; these figures do not include vessels used exclusively for river navigation.

The 1920 total comprises seven vessels fitted with internal combustion engines, including two of 5,370 and 5,155 tons respectively, and also three vessels of 19,000 tons fitted with steam turbines.

Two vessels of 8,100 tons each were launched and seven vessels of between 5,000 and 7,500 tons each.

## SCANDINAVIAN COUNTRIES

Denmark, Norway, and Sweden, launched during 1920 163,347 tons of shipping, 17,032 tons more than in 1919. Denmark increased her output by 22,903 tons, Sweden increased hers by 12,852 tons, and Norway's was decreased by 18,723 tons.

The total included four vessels of between 5,000 and 5,600 tons each launched in Sweden, and three motor vessels launched in Denmark of between 5,900 and 7,150 tons each.

The tonnage of steel vessels fitted with internal combustion engines launched in Denmark, viz., 24,352, is the largest for any European country outside of the United Kingdom.

## ITALY

Italy's output for 1920 of 133,190 tons shows an increase over that of 1919 of 50,477 tons. The output of Trieste, 29,191 tons, is included. The totals comprised



SESSIONAL PAPER No. 21

nine steamers of between 5,000 and 5,800 tons, one of 6,500 tons and the *Caracciolo* of about 25,000 tons, a former warship now converted into a merchant vessel. Including this latter vessel eight vessels with a total tonnage of 63,208 were fitted with steam turbines.

FRANCE

French shipbuilding shows a distinct revival; the 1920 output of 93,449 tons exceeded the 1919 one by 60,786 tons. French production is still, however, below the pre-war figures. The French built during 1920 six steamers of between 5,000 and 6,700 tons and one of about 9,500 tons.

SPAIN

Spain's 1920 output of 45,950 tons fell short of her 1919 one by 6,659 tons. It included five steamers of between 5,000 and 6,000 tons, and the *Alfonso XIII*, a turbine steamer, of 10,137 tons.

SUMMARY

	Tons.
United States .. .. .	2,476,253
United Kingdom.. .. .	2,055,624
Japan .. .. .	456,642
Canada, 159,551 tons, other Dominions 44,093 tons.. .. .	203,644
Holland .. .. .	183,149
Scandinavian countries (Denmark, Norway, Sweden) .. .. .	163,347
Italy .. .. .	133,190
France .. .. .	93,449
Spain .. .. .	45,950

GENERAL REVIEW

A marked feature of the shipbuilding situation during 1920 has been the decline of the industry in the United States. At the close of December, 1919, the United States had 2,966,515 tons of shipping in hand, at the end of December, 1920, she had 1,310,312 tons in hand a decrease of 1,656,203 tons; American shipbuilding had been more than cut in half.

In foreign countries other than the United States the tonnage building at the end of 1920 was 260,000 tons more than that in hand at the end of 1919.

The increase in France amounted to 181,000 tons, in Holland to 123,000 tons. Japanese shipbuilding decreased by 61,000 tons and Canadian by 52,000 tons.

At the end of 1920 the United States had under construction 1,310,000 tons of shipping, Holland 451,000 tons, France 398,000 tons, Italy 364,000 tons, and Japan 249,000 tons.

WORLD'S TOTAL OUTPUT OF MERCHANT VESSELS DURING 1920.

Where Built.	Steamers.		Motor Vessels.		Sailing Vessels and Barges.		Total.	
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
United Kingdom.....	556	1,953,014	25	86,940	37	15,670	618	2,055,624
*Other Countries.....	907	3,599,993	75	103,037	159	103,012	1,141	3,806,042
Total for the world.....	1,463	5,553,007	100	189,977	196	118,682	1,759	5,861,666

\*Excluding Germany, complete figures for which country are not yet available.

Lloyds table shows the world's total output of merchant ships during 1920 to have been 5,861,666 tons, a decrease of 1,282,883 tons as compared with 1919, but an increase of more than two and one-half million tons over the output for 1913 the pre-war record year.



12 GEORGE V, A. 1922

In 1920 the United Kingdom launched 35 per cent of the world's output, as compared with 22½ per cent in 1919 and 58 per cent in 1913. Of the 1920 world's output about 1,825,000 tons of vessels were fitted with steam turbines.

During the years 1918-20 new construction added to the world's merchant shipping about 18½ million tons.

COMPARATIVE COSTS OF SHIPBUILDING AND SHIP OPERATING IN BRITAIN;  
PRE-WAR AND 1920

The tables here given are taken from Lloyds list, January 21, 1921.

COST OF BUILDING A 10,000 TO 11,000 TONS D.W. SHIP

	1913-14	1920
Labour (hull) .. .. .	£ 18,000	£ 52,400
Labour (engines and boilers) .. .. .	6,300	13,600
Material (hull) .. .. .	38,000	100,000
Material (engines and boilers) .. .. .	11,600	37,200
	£ 73,900	£ 203,200

The cost of shipbuilding in 1920 was about 275 per cent higher than in 1913-14.

PERCENTAGE COST OF RUNNING, 1920, COMPARED WITH 1913-14

	Coasting and home p.c.	Foreign p.c.
Bunkers .. .. .	327	473
Provisions .. .. .	...	286
Deck and engine stores .. .. .	163	326
Wages .. .. .	184	233
Port disbursements .. .. .	102	190
Insurances .. .. .	131	321
Repairs and survey .. .. .	193	358
Total (exclusive of management and depreciation)	149	280

This table was compiled by taking the average cost of operation of seven coasting trade steamers ranging from 1,125 to 2,500 tons d.w., and the average cost of operation of twelve overseas steamers ranging from 3,200 to 8,350 tons d.w. The percentage increase is given for the items stated. Under "port disbursements" are included loading and discharging, pilotage, brokerage and commission, trimming, dues, agency and dispatch.

The operating costs for coasting vessels in 1920 were 149 per cent higher than in 1913-14; and for foreign-going ships 280 per cent higher.

The present cost of building and operating merchant ships, coupled with the fall in ocean freight rates, account for the present depressed state of British shipbuilding; and as somewhat similar conditions prevail in the other chief maritime countries, for the general depression in the shipbuilding and allied trades.

OIL VERSUS COAL AS SHIPS' FUEL

Although in the British navy the use of oil as fuel for ships has for some time been general, it is only recently that the leading British passenger steamship companies have engaged in building oil-burning ships, and in converting coal burners into oil burners.

The superior speed of oil-burning ships has been proved conclusively, and this has a great effect on competition in the sea-carrying passenger trade, as people generally prefer to travel by the faster ship.

For a long time the leading shipping men and the leading marine papers in Britain were somewhat skeptical about the superiority of oil to coal as a fuel for general use in the merchant marine; but of late expert opinion in Britain has been steadily inclining in favour of oil.



## SESSIONAL PAPER No. 21

The London *Engineer* of February, 1919, makes some interesting comparisons between oil and coal as steam raising fuels, the result of extensive experiments carried out by the British navy. The points in favour of oil over coal are: (1) radius of action increased by 50 per cent on equal bunker weight, and by 80 per cent on equal bunker space; (2) up to 83 per cent thermal efficiency instead of 60 per cent (in America thermal efficiency as high as 84.5 per cent has been obtained by using Mexican fuel with the pressure system of oil burning in Scotch marine boilers); (3) boilers can be forced up to 50 per cent above normal rating; (4) control of smoke; entire absence of smoke screen as desired; (5) reduction of labour by about 70 per cent; (6) constructional advantages; (7) bunkering at sea.

The Information Bureau of the United States Shipping Board gives some interesting facts regarding the relative merits of oil and coal as fuel for ships. A ton of oil used in Diesel internal combustion engines gives six times the power of a ton of coal with turbine or reciprocating engines. A ton of oil used in oil-burning boilers of turbine or reciprocating engines will give twice the power of a ton of coal used with the same types of engines.

In the case of an 8,800 tons deadweight steel ship plying with full cargo between New York and Liverpool in March, 1919, the maximum cost of fuel at that time was \$1.12 for oil and \$0.84 for coal per cargo ton. Oil fuel for this ship was 16.1 per cent and coal fuel 12 per cent of the total cost of operation.

The length of the route makes a substantial difference. For the same type of ship plying between Norfolk, Va., and Valparaiso, the costs were \$1.52 for oil as against \$1.42 for coal per cargo ton. The chief advantages of oil over coal are: cutting down of crew, saving in fuel consumption, greater speed, and increased cargo space. Minor advantages are lower cost of wages and subsistence for officers and men, less expenditure for interest and depreciation on stores and supplies, and sometimes insurance.

Possibly the most important advantage of oil is the increased cargo space afforded by its use.

In the case of a 10,000 deadweight tons ship on a voyage of 7,000 miles using oil-burning boilers with turbine or reciprocating engines the saving in cargo space for fuel would amount to 800 tons; were the same ship to use Diesel internal combustion engines the saving in cargo space would be 1,340 tons.

Taking \$50 a ton as a fair average value for cargo space, an additional capacity of 800 tons would in the case of this ship mean a saving of \$40,000.

In the new American Merchant Marine the use of oil has become very general, as is shown by the approximate statement of oil-burning and coal-burning ships and their tonnage at the beginning of 1920 given by the United States Shipping Board:—

	Oil Burning	Coal Burning	Total
Number of vessels .. .. .	1,188	518	1,706
Total deadweight tons .. .. .	8,965,978	2,481,408	11,447,386

The information Bureau of the United States Shipping Board gives in detail some examples of the operations of American oil-burning ocean ships in 1918 and 1919.

The *Mount Hood*, 4,600 deadweight tons, in a voyage of 7,900 miles from San Francisco to Chile and back to Mobile, burnt 1,600 barrels of oil, her average consumption being 0.2 of a barrel, or 8.4 gallons per mile.

By installing oil burning engines on the *San Juan* and the *Ponce* of the New York and Porto Rico line, their steaming radius was increased to 6,000 miles, an addition of 2,500 miles to their former radius. Under coal the *San Juan* had a speed of 10½ knots, under oil of 12 knots. The removal of the *San Juan*'s coal bunkers added 500 tons to her deadweight capacity and gave her an increased passenger space. The use of oil engines reduced the number of her engine crew from 78 to 68.



The *Sagaporack*, a 7,500 deadweight tons oil-burning cargo boat, carried only 38 men, about the same number usually carried on a 3,500 deadweight ton coal-burner plying on the Great Lakes.

The *Empress of Britain*, 14,189 gross tons C.P.O.S. liner, and the first Canadian transatlantic liner to use oil-burning engines arriving in Quebec in September, 1920, found that on the passage from Liverpool to Quebec she had used 1,453 tons of Mexican crude oil, as against 1,800 tons of coal under the old system. She maintained an average speed of 18.56 knots. Under coal she required 120 stokers and trimmers; this was reduced to 27 with oil.

The White Star liner *Olympic* on being converted into an oil burner, reduced her engine room crew by 153. She carries 27,000 barrels or 5,200 tons of oil in her double sides, a new departure in ship construction.

The logs of a number of United States Shipping Board vessels indicated that on turbine or reciprocating steamers about 1.25 barrels of oil per indicated horse-power were used. On motor ships (Diesel engines) the rate was 0.5 of a barrel per indicated horse-power.

It is estimated that beginning with 1921, approximately 60,000,000 barrels of oil will be needed for ships operated by the United States Shipping Board; this excludes private constructions after August 1, 1919.

Mr. Charles M. Schwab, head of the Bethlehem Shipbuilding Company, announced in September, 1920, that the company's chief designer, Arthur West, had perfected a Diesel two-cycle internal combustion heavy oil engine which produced the same horse-power as the old four-cycle engine of nearly twice its size, and that, too, with a saving of about 67 per cent in oil fuel cost, as compared with steam-driven oil-fired engines.

He stated that in his opinion this engine was admirably adapted for use in large cargo ships.

Should the West engine in actual practice fulfil, or even partially fulfil these predictions with regard to increased power and diminished cost of fuel, it will mean a distinct advance in the production of marine oil-burning engines, and make more imperative the possession of supplies of fuel oil for maritime nations.

WORLD'S FUEL OIL SUPPLY

The oil supplies of the world in April, 1921, are thus estimated by *Shipping*:—

Country	Barrels	
United States .. .. .	7,000	millions
Canada .. .. .	1,000	"
Mexico .. .. .	5,000	"
Northern South America .. .. .	6,000	"
Southern South America .. .. .	4,000	"
Algeria and Egypt .. .. .	1,000	"
Persia and Mesopotamia .. .. .	8,000	"
Russia .. .. .	10,000	"
Roumania and Western Europe .. .. .	1,500	"
Northern Russia and Saghallen .. .. .	1,000	"
Japan and Formosa .. .. .	1,500	"
China .. .. .	2,000	"
India .. .. .	1,000	"
East Indies .. .. .	4,000	"
Australasia .. .. .	1,000	"
Total .. .. .	54,000	millions

NOTE:—42 gallons to the barrel, 5.2 barrels to the ton.



SESSIONAL PAPER No. 21

AMERICA'S MERCHANT MARINE

The tables here given are taken from the report of the United States Commissioner of Navigation, June 30, 1920:—

NUMBER AND TONNAGE OF AMERICAN SEA-GOING SHIPS (FOREIGN AND COASTING) OF 1,000 GROSS TONS OR OVER FROM JUNE 30, 1917 TO JUNE 30, 1920.

June 30.	Sailing and Schooner Barges Wood and Steel.		Steam and Gas Vessels.				Total.	
			Wood.		Steel.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
1917.....	327	538,196	41	58,895	660	2,696,368	1,028	3,293,459
1918.....	315	518,216	91	161,425	874	3,627,251	1,280	4,306,892
1919.....	329	533,580	293	693,541	1,436	6,072,901	2,058	7,300,022
1920.....	397	642,260	377	933,424	2,065	9,270,418	2,839	10,846,102

Comparing June 30, 1920, with June 30, 1919, American sea-going merchant tonnage increased by 3,546,080.

The peak of American shipbuilding was reached in 1919; since then a number of the larger shipyards, including Hog island with fifty ways, have been abandoned, and American output has steadily declined; but the fact remains that to-day America is easily the second maritime power, with a sea-going fleet twice as large as Germany's at the outbreak of war.

It was not until 1917 that the United States started serious shipbuilding operations. In the space of three years she has trebled her overseas shipping, the figures for 1917 being 3,293,459 tons, and for 1920, 10,846,102.

NUMBER AND GROSS TONNAGE OF STEEL SEA-GOING SHIPS CLASSIFIED ACCORDING TO SIZES, JUNE 30, 1920

Gross tons	No.	Gross tons
1,000-2,000 .. .. .	96	157,986
2,000-3,000 .. .. .	605	1,501,627
3,000-4,000 .. .. .	271	945,702
4,000-5,000 .. .. .	167	773,043
5,000-6,000 .. .. .	436	2,447,055
6,000-7,000 .. .. .	332	2,111,898
7,000-8,000 .. .. .	95	704,202
8,000-9,000 .. .. .	33	278,020
Over 9,000 .. .. .	30	350,885
Total .. .. .	2,065	9,270,418

This table shows that very nearly one-half of the total American steel sea-going tonnage on June 30, 1920, was made up of ships ranging between 5,000 and 7,000 gross tons or 8,000 and 11,200 in deadweight tons. The American practice conforms to the opinion generally held that this size of ship gives, as a rule, the best return on outlay.

TOTAL AMERICAN MERCHANT TONNAGE, JUNE 30, 1917 to JUNE 30, 1920

June 30.	Foreign Trade.	Coasting Trade.		Total.
		Great Lakes.	Sea and River.	
1917.....	2,446,399	2,769,824	3,634,814	8,871,037
1918.....	3,603,706	2,708,523	3,612,289	9,924,518
1919.....	6,669,726	2,635,680	3,601,894	12,907,300
1920.....	9,928,595	2,595,062	3,800,367	16,324,024



12 GEORGE V, A. 1922

The astonishing growth of America's merchant marine between 1917 and 1920 is due entirely to the increase of her overseas shipping; the coastwise tonnage has declined slightly, the exact figures being 6,434,638 for 1917, and 6,395,429 for 1920; whereas the overseas tonnage between 1917 and 1920 has quadrupled. In 1914 only about 10 per cent of the total value of American exports and imports was carried in American bottoms. In 1920 45 per cent of the total value of America's exports and 39 per cent of the total value of her imports were carried by American ships.

#### JONES SHIPPING ACT

On June 4, 1920, this Bill introduced by Senator Wesley L. Jones, of the state of Washington, passed both houses of Congress, and received the President's assent, and was signed by him and became law on June 5, with the exception of section 34, from the provisions of which the President dissented and which for the present remains inoperative.

In many respects the Bill is practically a new American Merchant Marine Act, conferring on the United States Shipping Board powers not previously possessed by it, regulating the sale of American ships to aliens, allocating ex-enemy tonnage, revising completely the laws relating to coastwise shipping, and providing for the building up of an American bureau of shipping to serve as a sort of American Lloyds.

Two of its sections, Nos. 28 and 34, have aroused wide controversy both in the United States and abroad.

Section 28 by giving high preferential rates on all American railways to imports and exports carried in American bottoms in the Pacific trade, practically closes all American Pacific ports to foreign shipping, which owing to discriminatory railway rates could only be operated at a distinct disadvantage in competition with American ships.

Section 21 of the Act also brings the Phillipines under the new American Coastwise Shipping law.

Not only have Britain, Japan, Norway, and other maritime countries expressed their disapproval of the provisions of section 28, but a number of American Pacific ports, in particular Seattle, are strongly opposed to it, pointing out that it will have the effect of driving foreign shipping from American Pacific ports to Canadian Pacific ports, or to American Atlantic and Gulf ports, to which the section does not apply.

Mr. C. J. France, Executive Secretary of the Seattle Port Commission, stated that 75 per cent of the raw material for American manufactures came from the Orient, that the Pacific ports were 3,000 miles nearer this source of supplies than the Atlantic and Gulf ports, and that any diversion of trade from the former to the latter would be to the detriment of American manufacturers, and make it more difficult for America to compete with Japan, Holland, Great Britain, and other maritime nations in the business of the Far East. To this the Shipping Board replied that American tonnage would replace foreign tonnage in the Pacific trade.

Despite this a number of American shipping interests and shipping men endorsed the attitude of the Seattle Port Commission, contending that should foreign countries retaliate and impose discriminatory rates and duties on American shipping entering foreign ports a severe check might be given to the world wide activities of America's merchant marine.

The chief objections of a number of American Pacific ports to section 28 of the Act are thus summed up:—

(1) That it will create ill-feeling with foreign nations, who will not hesitate to adopt retaliatory measures against American ships entering foreign ports.

(2) That it is a wrong form of subsidy if it be a subsidy at all. It is agreed that American vessels must be subsidized but it should be done in such a way as not to cause international ill-feeling and complications.



## SESSIONAL PAPER No. 21

(3) Foreign and American ships can compete at New York and other Eastern ports on equal terms; consequently shipping will be diverted from the Pacific.

(4) If section 28 is applied, foreign ships can also be diverted to British Columbia ports and there enjoy equal privileges.

(5) Neither the Shipping Board nor the Interstate Commerce Commission can control rail rates via the Canadian lines except for the small portion of the haul which is within United States territory.

(6) Much of the Pacific traffic is under routing control of interests favourable to shipping in foreign bottoms.

Section 34 of the Act reads: "That in the judgment of Congress, articles or provisions in treaties or conventions to which the United States is a party, which restrict the right of the United States to impose discriminating customs duties on imports entering the United States in foreign vessels and in vessels of the United States, and which also restrict the right of the United States to impose discriminatory tonnage dues on foreign vessels and on vessels of the United States entering the United States should be terminated, and the President is hereby authorized and directed within ninety days after this Act becomes law to give notice to the several Governments, respectively, parties to such treaties or conventions, that so much thereof as imposes any such restriction on the United States will terminate on the expiration of such periods as may be required for the giving of such notice by the provisions of such treaties or conventions."

The chief countries with which the United States had treaties providing for a common footing in shipping both in direct and indirect trade were:—

Argentina .. .. .	1853	Liberia .. .. .	1862
Belgium .. .. .	1875	New Grenada.. .. .	1849
Bolivia .. .. .	1858	Netherlands .. .. .	1852
China .. .. .	1880	Norway .. .. .	1827
Denmark .. .. .	1826	Ottoman Porte .. .. .	1862
Greece .. .. .	1837	Paraguay .. .. .	1859
Honduras .. .. .	1864	Spain .. .. .	1902
Italy .. .. .	1871	Sweden .. .. .	1827
Japan .. .. .	1894		

And in direct trade only:—

Costa Rica .. .. .	*1822	Great Britain .. .. .	1815
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\*Permits limited discrimination.

The President disapproved of section 34 on the grounds, first, that America had entered into these treaties for her own advantage, and that to abrogate them now, merely because she considered it in her interest to do so, would be a violation of good faith, and a blow at the sanctity of treaties generally; and, second, that in the event of the countries involved retaliating, as would be probable, it would mean a rate war for which America would be responsible, and which might have an injurious effect on her foreign trade.

Although there was a diversity of opinion among American shipping journals and shipping interests as to the advisability of enforcing this section of the Act, such high authorities as the *New York Journal of Commerce*, Mr. G. F. Trowbridge, former President of the American Importers and Exporters Association, and Mr. P. A. S. Franklin, President of the International Mercantile Marine Company, supported the views taken by the President.

The linking up of the leading German lines with American shipping companies, and the drastic provisions of sections 28 and 34 of the Jones Act, both of which shipping policies had the active support of the United States Shipping Board, would seem to indicate that this body under the chairmanship of Admiral Benson is preparing to make a determined bid, with German aid, for the maritime supremacy of America.



12 GEORGE V, A. 1922

## MARINE ACTIVITIES AFFECTING CANADIAN PORTS

During the first nine months of 1920, from January to September, inclusive, more steamship routes from Canadian ports were inaugurated than in the previous fifteen years. This was largely due to the enterprise of the Canadian Government Merchant Marine.

The Canadian Government Merchant Marine opened up a new service from Vancouver, B.C., to Australian and New Zealand ports, and a new service is contemplated between Eastern Canada and South Pacific ports. One of their vessels, the *Canadian Raider*, has been put on the Montreal to New Zealand route via the Panama canal, conveying Eastern Canadian products to the Antipodes. The ships plying to Australia secure wool for their chief return cargoes.

New freight services have been established by the Canadian Government Merchant Marine to London, Liverpool, and Glasgow, from Montreal; and summer services from St. John, N.B., and Halifax, N.S., to various British ports. They have now also regular summer sailings from Montreal to the West Indies, and to Brazil and Argentina, a regular service from Halifax to the British West Indies and fortnightly to Cuba, and a weekly service from St. John, N.B., to Cuba and the Bahamas.

The products of the farms, forests, and fisheries of Eastern Canada form the principal export cargoes to the West Indies; the return cargoes consist chiefly of sugar for the Canadian refineries at Halifax, St. John, and Montreal.

The Canada Steamship Lines, in conjunction with the Compagnie Générale Transatlantique, are operating services from Montreal to Havre and Bordeaux and have put two 12,000-ton boats on the Antwerp route.

The Marine Navigation Co. has opened a new service between Montreal and St. Nazaire, France, and another to the east coast ports of South America.

The Norwegian-American Line has sailings from St. John, N.B., to three Norwegian ports, and the Canadian Pacific Ocean Services have boats running from Montreal to Norway and Sweden.

The Cunard has established a new Canadian service to Bristol and Dublin.

The Houston Line has inaugurated a new service between Canada and Buenos Ayres, Montevideo, and Rosario. Pickford and Black are running boats from Halifax to Jamaica and Santiago, Cuba.

The Elder-Dempster Company have added to their service between Canada and five South African ports another between Canada and West Africa; some vessels of the Canadian Government Merchant Marine may participate in this trade; as the Elder-Dempster Company has already a fleet of coasting and river boats operating in West African waters, a large portion of Africa will be opened up to Canadian trade.

In the transatlantic passenger trade in 1920 the new C. P. O. S. oil-burning turbiner *Empress of Canada*, 22,000 tons, will be employed, together with the allocated German liner *Crown Prince Wilhelm* and the liners *Empress of Britain* and *Victorian*, commissioned as auxiliary cruisers during the war.

The Dollar Steamship Line has opened up a new service between Vancouver and ports in China and Japan.

In September, 1920, the *Canadian Pioneer*, 8,390 tons deadweight, began a Canadian service to the East Indies from Montreal, via the Suez canal to Karachi, Bombay, Colombo, and Java. Should trade develop and the situation warrant, other vessels of the Canadian Government Merchant Marine will be employed on these routes.

When some of the Government ships contracted for but not yet completed are put in commission, the opening of a trade route from Vancouver to the Orient is contemplated.



## SESSIONAL PAPER No. 21

## CANADIAN GOVERNMENT SHIPBUILDING PROGRAMME, APRIL 1, 1921

Yard No.	Name.	Builders.	Date of Contract.	D.W. Ton.	Cost per Ton.	Total Cost.	Remarks.
66	Canadian Voyageur.....	Vickers.....	Mar. 4, 1918	4,300	\$207 00	\$947,025	Built and in commission.
67	Canadian Pioneer.....	"	May 22, 1918	8,390	180 00	1,510,200	"
61	Canadian Warrior.....	Collingwood.	May 18, 1918	3,990	205 00	817,950	"
100	Canadian Volunteer...	Wallace ..	Mar. 15, 1918	4,485	207 00	928,395	"
106	Canadian Trooper.....	" .....	Nov. 25, 1918	4,540	217 00	985,180	"
101	Canadian Aviator.....	" ..	Nov. 25, 1918	5,100	210 00	1,071,000	"
102	Canadian Railer	"	Nov. 25, 1918	5,100	210 00	1,071,000	"
62	Canadian Recruit	Collingwood.	July 5, 1918	3,990	205 00	817,950	"
63	Canadian Signaller.	"	Oct. 17, 1918	3,990	205 00	817,950	"
64	Canadian Gunner	"	Oct. 17, 1918	3,990	205 00	817,950	"
5	Canadian Settler.....	Tidewater...	Aug. 9, 1918	5,100	200 00	1,020,000	"
6	Canadian Rancher.....	"	Aug. 9, 1918	5,100	200 00	1,020,000	"
7	Canadian Fisher..	"	Jan. 24, 1919	5,100	200 00	1,020,000	"
8	Canadian Forester.....	"	Jan. 24, 1919	5,100	200 00	1,020,000	"
459	Canadian Trapper	Davie..	Sept. 4, 1918	5,100	200 00	1,020,000	"
460	Canadian Hunter.....	"	Sept. 4, 1918	5,100	200 00	1,020,000	"
39	Canadian Trader.....	Port Arthur	Sept. 4, 1918	3,400	205 00	697,000	"
40	Canadian Sailor.....	"	Sept. 4, 1918	3,400	205 00	697,000	"
41	Canadian Adventurer.	"	Mar. 1, 1919	3,400	210 00	714,000	"
42	Canadian Sower	"	Mar. 1, 1919	3,400	210 00	714,000	"
1	Canadian Mariner.....	Halifax ..	Sept. 13, 1919	8,390	195 00	1,636,050	"
2	Canadian Explorer.	" .....	Sept. 13, 1919	8,390	195 00	1,636,050	"
73	Canadian Navigator..	Vickers.....	Oct. 11, 1918	4,575	215 00	983,625	"
68	Canadian Ranger ..	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
69	Canadian Seigneur. .	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
70	Canadian Miller.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
71	Canadian Spinner.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
72	Canadian Planter.....	Vickers.....	Oct. 11, 1918	8,390	188 00	1,577,320	"
1	Canadian Winner.....	Victoria	Jan. 24, 1919	8,390	198 00	1,661,220	"
2	Canadian Traveller...	"	Jan. 24, 1919	8,390	198 00	1,661,220	"
15	Canadian Beaver	Collingwood..	Dec. 11, 1918	3,990	205 00	817,950	"
43	Canadian Runner ..	Port Arthur	Mar. 1, 1919	4,575	215 00	983,625	"
44	Canadian Carrier.....	"	Mar. 1, 1919	4,575	215 00	983,625	"
11	Canadian Importer ..	Coughlan	Nov. 22, 1918	8,390	198 00	1,661,220	"
12	Canadian Exporter ..	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
13	Canadian Inventor....	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
14	Canadian Prospector..	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
3	Canadian Cruiser.....	Halifax	Dec. 10, 1918	10,500	197 50	2,073,750	"
4	Canadian Constructor..	"	Dec. 10, 1918	10,500	197 50	2,073,750	"
5	Canadian Sealer	Nova Scotia..	Mar. 31, 1919	2,800	210 00	588,000	Built and in commission.
6	Canadian Miner.....	"	Mar. 31, 1919	2,800	210 00	588,000	"
1	Canadian Reamer	Prince Rupert	Feb. 21, 1919	8,390	198 00	1,661,220	"
2	Canadian Thrasher.....	"	Feb. 21, 1919	8,390	198 00	1,661,220	"
4	Canadian Otter.....	British American	Jan. 23, 1919	4,575	215 00	983,625	Built and in commission.
5	Canadian Squatter ..	"	Jan. 23, 1919	4,575	215 00	983,625	"
65	Canadian Farmer	Collingwood.	July 1, 1919	3,990	180 00	718,200	"
66	Canadian Observer.....	"	July 1, 1919	3,990	180 00	718,200	"
10	Canadian Pathfinder...	Dominion.	July 11, 1919	3,500	180 00	630,000	"
11	Dominion Engineer.....	"	July 11, 1919	3,500	180 00	630,000	"
77	Canadian Victor.....	Vickers.....	Sept. 18, 1919	8,390	170 00	1,426,300	"
78	Canadian Conqueror.	"	Sept. 18, 1919	8,390	180 00	1,426,300	"
79	Canadian Commander	"	Sept. 18, 1919	8,390	170 00	1,426,300	"
80	Canadian Leader.....	"	Sept. 18, 1919	8,390	170 00	1,426,300	"
10	Canadian Logger.....	Midland..	Feb. 26, 1920	3,890	180 00	718,200	"
103	Canadian Highlander..	Wallace..	Mar. 18, 1920	8,390	167 50	1,405,325	Built and in commission.
104	Canadian Skirmisher...	"	Mar. 18, 1920	8,390	167 50	1,405,325	"
67	Canadian Rover .....	Collingwood..	Mar. 13, 1920	3,890	182 50	709,925	Built and in commission.
K-16	Canadian Coaster.....	"	Mar. 13, 1920	3,890	182 50	709,925	"
8	Canadian Sapper.....	Nova Scotia..	"	2,800	190 00	532,000	Built and in commission.
476	Canadian Challenger..	Davie	Feb. 2, 1920	8,390	167 50	1,405,325	"
45	Canadian Harvester..	Port Arthur	Feb. 26, 1920	3,890	182 50	709,925	"
20	Canadian Transporter..	Coughlan...	"	8,350	167 50	1,398,625	"
21	Canadian Freighter.....	"	"	8,350	176 50	1,398,625	"

Of the original Government programme of 63 ships, totalling 380,160 tons d.w., 48, tonnage 273,450, have been built and are in commission, leaving 15, tonnage 106,710, still to be completed as follows: two 10,500 tons d.w. ships building at the Halifax Shipyards; three 8,390 tons d.w. ships at the Wallace Shipyards, Vancouver, B.C.; two 3,500 tons d.w. ships and one of 3,890 tons at Collingwood, Ont.; two 8,390 tons d.w. ships at Vickers, Ltd., Montreal; one 3,890 tons d.w. ship at Midland, Ont.; one 8,390 tons d.w. ship by the Davie Shipbuilding and Repairing Co., Levis, P.Q.; one 3,890 tons d.w. ship by the Port Arthur Shipbuilding Co., and two 8,350 tons d.w. ships by Coughlan & Sons, Vancouver, B.C.



12 GEORGE V, A. 1922

A number of the new sea trade routes opened up by the Canadian Government Merchant Marine have already been given under the heading "Marine Activities Affecting Canadian Ports."

At the close of 1919, when about 20 of these ships were in commission, they had carried \$21,362,000 worth of Canadian exports; gross earnings were \$3,448,030, and net earnings \$1,406,000. By the close of 1920 the shipping trade everywhere was adversely affected, and in a marked degree. Competition was keen, due to a glut of shipping and a dearth of cargoes, and ocean freight rates fell sharply, while operating expenses remained high; as a result Canadian shipping in common with world shipping suffered, and although double the number of ships as compared with 1919 were in commission, and these carried about \$50,000,000 worth of Canadian exports, the gross earnings fell to \$1,293,525, and net earnings, deducting depreciation, outstanding liabilities, and incorporation expenses, to \$781,460. Offsets to this cut in the profits are the increase in the volume of the Canadian export trade, due to the ships of the Government Merchant Marine, and the acquisition of new foreign markets.

There were employed on the ships of the Canadian Government Merchant Marine during 1920:

Masters .. .. .	48
Officers .. .. .	138
Engineers .. .. .	183
Seamen, firemen, stewards, etc. .. .. .	1,305
Total .. .. .	1,674

AUSTRALIAN SHIPBUILDING PROGRAMME 1920-21

The Department is indebted to Mr. G. H. Knibbs, Commonwealth Statistician, for this statement:—

STEEL STEAMERS

Locality	No.	Builders	Type
Williamstown .. .. .	5	Commonwealth Ship Construction Branch	Steel Cargo Vessels.
Walsh Island.....	6	N. S. W. Government.....	" "
Cockatoo Island .. .. .	4	Commonwealth Navy Department.....	" "
Maryborough Qsld .. .. .	2	Walkers Ltd .. .. .	" "
Adelaide .. .. .	3	Poole & Steel .. .. .	" "

The first portion of this programme consisting of 6 vessels of approximately 5,600 tons deadweight has been completed, and the ships in commission, viz: *Delungra*, *Dinoga*, *Dilga* (built at Walsh island), *Dromana* and *Dumosa* (built at Williamstown), and *Dundula* (built at Cockatoo island). In addition to these, three further vessels of similar dimensions, but of the Shelter Deck type, and a deadweight capacity of approximately 6,000 tons, have been completed and are in commission, viz: *Emila* (built at Williamstown), and *Eurelia* and *Enoggera* (built at Walsh island). It is expected that the *Eromanga* (built at Walsh island), the *Eudunda* (built at Cockatoo island) and the *Erriba* (built at Williamstown) will very shortly be handed over to the owners.

Of the remainder, nine are to be sister ships to the "E" boats above referred to. One of these, the *Eurimba*, under construction at the yards of Messrs. Poole & Steel, at Adelaide, was launched on 20th April, 1921, the *Echuca* being built at the yards of Messrs. Walkers, Ltd., Maryborough, Queensland, will be launched in May, 1921, while the construction of the hulls of the *Eurora* (Williamstown), the *Echunga* (Walkers, Ltd.), and the *Euwarra* (Poole & Steel) is well advanced.



## SESSIONAL PAPER No. 21

As soon as practicable, a commencement will be made with the construction of the remaining four vessels of this class, the materials for which have almost all been delivered.

The programme, as will be seen, embraces two other vessels which are to be built at Cockatoo island. These are of a much larger type, 520 feet in length, with a deadweight capacity of 12,800 tons, speed at sea 13 knots, and providing 250,000 cubic feet of insulated space.

It is expected that the whole of this programme will be completed in about three years' time.

## OPERATIONS OF CHIEF CANADIAN SHIPBUILDING PLANTS

WALLACE SHIPBUILDING & DRYDOCK CO., LTD., NORTH VANCOUVER, B.C.

Vessels built and building during 1920-21 were:—

Name.	Length	Breadth	Depth	Speed Knots	D.W. Tonnage
Canadian Aviator .....	331' B.P.	46' 6"	25' 6"	10½	5,100
Chilkoot .....	172' 10"	30'	14'	9	700
Canadian Highlander.....	400' B.P.	52'	31'	11½	8,350
Canadian Skirmisher.....	400' B.P.	52'	31'	11½	8,350
Princess .....	307' B.P.	48'	18' 6"	17	Passenger steamer

DAVIE SHIPBUILDING & REPAIRING CO., LTD., LAUZON, P.Q.

Vessels built and building during 1920-21 were:—

Name	Length B.P.	Breadth	Depth	D.W. Tonnage	Speed	Flag
Canadian Trapper (Steel).....	331' 0"	46' 6"	25' 6"	5,100	12 knots	Canadian.
Canadian Hunter (Steel).....	331' 0"	46' 6"	25' 6"	5,100	12 "	Canadian.
Marmoutiers (Wood) ....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Massevaux (Wood).....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Metz (Wood).....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Mulhouse (Wood).....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Neuf Brisach (Wood).....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Obernai (Wood).....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Pange (Wood) .....	195' 0"	39' 8"	17' 0"	1,430	9½ "	French.
Mapledene (Wood).....	215' 0"	36' 0"	21' 0"	1,800	10 "	Canadian
Canadian Challenger (Steel).....	400' 0"	52' 0"	31' 0"	8,350	11½ "	Canadian.

MIDLAND SHIPBUILDING CO., LTD., MIDLAND, ONT.

Vessels built and building during 1920-21 were:—

*Glenclova*, length 246 feet, breadth 42 feet 5 inches, depth 21 feet 5 inches, speed 9 knots, estimated cost \$550,000, tonnage d.w. 3,000. *Canadian Logger*, length 251 feet, breadth 43 feet 6 inches, depth 26 feet, speed 11 knots, estimated cost \$700,000, tonnage d.w. 4,000.

YARROWS, LIMITED, VICTORIA, B.C.

During 1920-21 the work of this yard was confined to ship repairing. Ships to the number of 115 were repaired, of which 73 were drydocked, total gross tonnage 261,188.



12 GEORGE V, A. 1922

The most extensive repair work was carried out on the G.T.P. passenger steamer *Prince Rupert*, submerged for two and a half months in Swanson bay. The repairs were completed and the ship handed over to the owners in May, 1921.

Three vessels of the Canadian Naval Squadron, including the destroyers *Patriot* and *Patrician*, were also overhauled and repaired; the tonnage of these ships is not included in that already given.

CANADIAN VICKERS, LIMITED, MONTREAL, P.Q.

The following vessels were built and delivered during 1920-21:—

Name	Length	Breadth	Depth	D.W. Tonnage	Speed Knots	Owners
Tatjana ....	400'	52'	31'	8,261	11½	Norweigan Interests.
Loch Tay	400'	52'	31'	8,262	11½	" "
Canadian Victor	400'	52'	31'	8,432	11½	Canadian Government
Canadian Conqueror	400'	52'	31'	8,407	11½	" "
Canadian Commander	400'	52'	31'	8,439	11½	" "

The ss. *Canadian Leader*, 8,430 d.w. tons, speed 11½ knots, built for the Canadian Government, though built during the fiscal year 1920-21, was not handed over until the opening of navigation in 1921.

The following two vessels were under construction for delivery in the spring of 1921:—

Name	Length	Breadth	Depth	D.W. Tonnage	Speed Knots	Owners
Idelfjord	365'	49½	29'	6,400	11½	Norwegian Interests.
Topdalsfjord	365'	49½	29'	6,400	11½	" "

Thirty-four vessels, gross tonnage 154,845, were repaired on the floating dock "Duke of Connaught" during the open season to November, 1920.

The auxiliary machinery department was kept busy throughout the year in the manufacture of cargo winches, windlasses, steering gears and telemotors.

PORT ARTHUR SHIPBUILDING CO., LTD., PORT ARTHUR, ONT.

Ships launched and delivered during the fiscal year 1920-21 were: *Canadian Runner* 4,410 d.w. tons, and *Canadian Carrier* 4,467 d.w. tons.

Ships launched but not delivered were: *Canadian Harvester* 3,950 d.w. tons, *Glenafton* 3,000 d.w. tons.

Repairs were effected to 69 vessels, 48 of which involved repairs to hulls.

NOVA SCOTIA STEEL & COAL CO., LTD., NEW GLASGOW, N.S.

Vessels built and building during 1920-21 were:—

Name.	Length	Breadth	Depth	D.W. Tonnage	Speed Knots	Estimated Cost
Volunda .....	270'	38'	20' 6"	2,785	9½	\$ 530,000 00
Canadian Sapper	270'	38'	20' 6"	2,781	9½	530,000 00
Sea King .....	137' 10"	28' 6"	10' 8"	250	11	176,000 00



## SESSIONAL PAPER No. 21

## COLLINGWOOD SHIPBUILDING CO., LTD. (KINGSTON YARD)

Work during 1920-21 was confined to the Kingston yard, at which the steamer *Canadian Coaster*, 2,422 gross tons, 251 by 43.6 by 23.6 feet, speed 12.2 knots, estimated cost \$718,867, was built.

## J. COUGHLAN &amp; SONS, LTD., VANCOUVER, B.C.

For the Canadian Government two vessels of 8,100 tons d.w. each were built, approximate cost \$1,600,000 each. For Swedish owners two ships of 8,800 tons d.w. each, approximate cost \$1,500,000 each, were built. Three other ships of 8,800 tons d.w. each were built on account of the firm for future sale.

In addition miscellaneous ship repair work to the value of \$25,000 was carried out during the season.

## TIDEWATER SHIPBUILDERS, LIMITED, THREE RIVERS, P.Q.

During 1920-21 two ships were built for the Canadian Government, the *Canadian Fisher*, 5,100 tons d.w., 331 by 46.6 by 25.6, feet, speed 12 knots, and the *Canadian Forester* of similar tonnage, dimensions, and speed.

Two engines were built for the two 10,500 tons d.w. ships building at the Halifax shipyards for the Canadian Government, and one for the *Canadian Challenger* building at the Davie plant. Three boilers were built for the *Canadian Challenger* and four for the *Canadian Constructor*, 10,500 tons d.w., building at the Halifax Shipyards, Limited.

## HALIFAX SHIPYARDS, LTD., HALIFAX, N.S.

The building of the two largest ships of the Canadian Government Merchant Marine, the *Canadian Cruiser*, and the *Canadian Constructor*, 10,500 tons d.w. each, was undertaken by this yard, both ships to be completed during the summer of 1921.



STATISTICS OF CANADIAN SHIPPING  
Statement of Vessels Built in Canada and Registered during the Year 1920

Province	Wood						Metal					
	Sailing			Steam			Sailing			Steam		
	Tonnage			Tonnage			Tonnage			Tonnage		
	No	Gross	Net	No	Gross	Net	No	Gross	Net	No	Gross	Net
Nova Scotia	60	14,785	12,417	14	2,403	1,199	12	961	768	1	1,789	1,056
New Brunswick	1	5	5	2	93	60	2	48	38	..	..	..
Prince Edward Island	3	231	229	..	..	..	1	49	41	..	..	..
Quebec	20	3,343	3,053	20	8,009	4,582	19	1,083	773	23	66,029	39,895
Ontario	1	20	20	8	560	259	3	55	23	2	4,503	2,702
Manitoba...	..	..	..	..	..	..	..	..	..	..	..	..
Saskatchewan	..	..	..	1	289	147	..	..	..	..	..	..
British Columbia	36	4,374	4,374	8	1,475	801	82	1,319	811	9	47,806	29,447
Yukon	..	..	..	..	..	..	..	..	..	1	116	79
Totals	121	22,758	20,098	53	12,829	7,048	119	3,495	2,454	35	120,127	73,100
										1	116	79
											159,325	102,779

Vessels Built in Canada during 1920 and Exported without being Registered  
in Canada

Province	Sailing			Steam		
	Wood			Steel		
	Tonnage			Tonnage		
	No	Gross	Net	No	Gross	Net
Nova Scotia	1	348	280	2	4,648	2,792
New Brunswick	..	..	..	2	11,066	6,587
Quebec	..	..	..	3	3,950	2,238
Ontario	..	..	..	2	11,471	7,057
British Columbia	1	348	280	9	31,135	18,674
Total						



## SESSIONAL PAPER No. 21

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1920

Ports	Sailing Vessels			Steam Vessels		
	No.	Gross Tonnage	Net Tonnage	No.	Gross Tonnage	Net Tonnage
<i>New Brunswick</i>						
Chatham.....	338	8,576	8,299	97	3,728	2,307
Dorchester.....	2	277	262	2	8	8
Moncton.....	3	55	53			
Richibucto.....	21	378	368	15	314	227
Sackville.....	2	114	101	1	16	11
St. Andrews.....	125	2,249	2,188	37	761	533
St. John.....	177	18,675	18,065	97	9,562	6,214
	668	30,324	29,336	249	14,389	9,298
<i>Nova Scotia</i>						
Amherst.....	2	97	80	3	168	96
Annapolis Royal....	14	3,594	3,181	8	493	318
Arichat.....	76	2,000	1,969	29	469	436
Barrington Passage.....	43	1,004	974	33	646	580
Canso.....	41	1,537	1,450	6	108	102
Digby.....	71	3,763	3,557	16	517	346
Guysboro.....	6	463	428			
Halifax.....	169	11,211	10,766	139	24,257	15,288
LaHave.....	42	10,271	8,468	5	432	325
Liverpool.....	26	3,421	2,993	25	1,025	576
Lunenburg.....	226	28,059	22,587	150	3,813	2,941
Maitland.....	7	930	826	1	88	59
Parrsboro.....	62	23,058	21,210	15	1,757	1,336
Pictou.....	11	2,416	2,251	13	4,018	2,445
Port Hawkesbury.....	41	878	863	9	229	193
Port Medway.....	6	544	502	5	76	71
Shelburne.....	42	2,698	2,467	19	888	680
Sydney.....	62	4,415	4,200	39	2,285	1,167
Truro.....				1	18	7
Weymouth.....	27	8,361	7,499	13	812	579
Windsor.....	32	18,990	17,557	15	4,047	2,559
Yarmouth.....	106	3,472	3,256	53	9,935	4,942
	1,112	131,182	117,084	597	56,081	35,046
<i>Ontario</i>						
Amherstburg.....	5	1,300	1,266	8	895	471
Belleville.....	3	241	217	11	241	144
Bowmanville.....	2	344	316			
Brockville.....	1	819	751	14	1,262	858
Chatham.....	4	566	556	8	339	226
Cobourg.....						
Collingwood.....	5	1,122	1,122	45	15,584	10,450
Cornwall.....				4	123	75
Deseronto.....	5	403	370	5	48	32
Dunnville.....	1	87	57			
Fort William.....	1	413	413	2	4,183	2,539
Goderich.....	4	675	675	29	1,529	1,016
Hamilton.....	3	807	780	20	9,160	5,700
Kenora.....	7	580	580	92	3,523	2,232
Kingston.....	53	8,217	7,302	103	8,416	4,885
Lindsay.....	19	1,224	1,224	28	626	416
Midland.....	7	3,681	3,166	48	59,110	39,402
Napanee.....	1	122	122			
Oakville.....	1	26	26			
Ottawa.....	110	17,365	16,431	213	43,645	22,850
Owen Sound.....	4	1,619	1,399	30	2,905	1,962
Peterboro.....	21	1,622	1,622	52	1,086	741
Picton.....	7	2,285	2,099	8	3,945	2,776
Port Arthur.....	66	21,841	21,352	77	32,793	20,517
Port Burwell.....	1	65	65	9	309	171
Port Dover.....	3	217	217	15	536	343
Port Hope.....	1	276	276			
Port Stanley.....				25	1,025	681
Prescott.....	9	1,473	1,345	13	2,298	1,553
Sarnia.....	8	2,432	2,250	37	30,286	18,817
Sault Ste. Marie.....	39	7,644	7,363	48	18,624	11,674
St. Catharines.....	22	6,004	5,417	46	1,546	993
Simcoe.....	2	36	36	2	35	18
Southampton.....	1	96	50	11	410	278
Toronto.....	65	14,259	12,408	268	100,565	63,943
Wallaceburg.....	2	490	475	9	381	264
Whitby.....						
Windsor.....	15	2,657	2,530	15	6,115	3,570
	498	101,008	94,278	1,295	351,543	219,597



12 GEORGE V, A. 1922

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1920—*Concluded*

Ports.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage	Net Tonnage	No.	Gross Tonnage	Net. Tonnage.
<i>Quebec.</i>						
Gaspé .....	11	456	422	3	266	186
Magdalen Islands.....	9	441	432	1	135	92
Montreal.....	282	96,501	92,590	394	413,950	253,103
Paspebiac.....	16	625	594	6	202	140
Quebec.....	365	32,478	31,477	162	28,166	16,103
Sorel .....	27	9,860	8,816	45	11,735	5,487
	710	140,361	134,331	611	454,454	275,111
<i>British Columbia</i>						
New Westminster.....	102	15,002	14,983	250	8,275	4,933
Prince Rupert.....	5	2,218	2,128	69	4,036	2,435
Vancouver .....	289	51,569	51,017	833	147,236	89,476
Victoria .....	110	22,716	21,680	272	52,361	30,829
	506	91,505	89,808	1,424	211,908	127,673
<i>P. E. Island</i>						
Charlottetown ..	112	7,184	6,718	31	7,074	3,275
<i>Saskatchewan</i>						
Prince Albert.....	1	145	145	3	449	248
<i>Manitoba</i>						
Winnipeg.....	16	3,921	3,921	67	7,908	5,198
<i>Yukon</i>						
Dawson.....				4	1,204	813

RECAPITULATION

Province	Sailing Vessels			Steam Vessels		
	No.	Gross Tonnage	Net Tonnage	No.	Gross Tonnage	Net Tonnage
New Brunswick.....	668	30,324	29,336	249	14,389	9,298
Nova Scotia.....	1,112	131,182	117,084	597	56,081	35,046
Ontario .....	498	101,008	94,278	1,295	351,543	219,597
Quebec.....	710	140,361	134,331	611	454,454	275,111
British Columbia.....	506	91,505	89,808	1,424	211,908	127,673
Prince Edward Island.....	112	7,184	6,718	31	7,074	3,275
Saskatchewan.....	1	145	145	3	449	248
Manitoba .....	16	3,921	3,921	67	7,908	5,198
Yukon.....				4	1,204	813
Totals ..	3,623	505,630	475,721	4,281	1,105,010	676,259



## SESSIONAL PAPER No. 21

STATEMENT showing Number of Vessels Removed from the Registry Books of the Dominion of Canada during the Year ended December 31, 1920

Sold to foreigners.. . . . .	58
Wrecked.. . . . .	129
Stranded.. . . . .	23
Lost.. . . . .	35
Broken up .. . . . .	680
Abandoned at sea.. . . . .	14
Collisions.. . . . .	3
Foundered.. . . . .	50
Burnt.. . . . .	46
Missing.. . . . .	1
Registry no longer required.. . . . .	12
Transferred to St. John's, Nfld .. . . . .	31
Transferred to Great Britain.. . . . .	2
Transferred to New Zealand.. . . . .	1
Transferred to British West Indies .. . . . .	4
Transferred to British Gulana.. . . . .	1
Total.. . . . .	<u>1,090</u>

It is estimated that 33,618 men and boys, etc., inclusive of masters, were employed on ships registered in Canada during the year 1920.



COMPARATIVE STATEMENT showing the Number of Vessels and Number of Net Tons on the Registry Books of the Dominion of Canada, on December 31, in each Year from 1911 to 1920, both inclusive

Province.	1911.		1912.		1913.		1914.		1915.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick	966	55,872	1,001	57,369	1,031	60,020	1,052	55,522	1,068	56,219
Nova Scotia	2,105	142,631	2,158	143,295	2,106	138,107	2,098	135,053	2,087	125,567
Quebec	1,511	193,682	1,566	227,048	1,628	247,225	1,663	259,143	1,590	267,897
Ontario	2,014	236,877	2,017	253,376	2,012	279,642	2,100	311,660	2,111	312,971
Prince Edward Island	149	9,683	148	9,577	149	10,071	149	10,029	158	11,518
British Columbia	1,227	122,264	1,376	136,618	1,506	15,306	1,591	147,192	1,643	144,835
Manitoba	96	6,373	95	6,096	93	5,545	103	7,999	81	7,480
Yukon District	15	2,708	14	2,543	15	2,940	11	2,295	11	2,295
Saskatchewan	5	356	5	356	5	356	5	529	5	530
	8,088	770,446	8,380	836,278	8,545	896,965	8,772	932,422	8,757	929,312
Province.	1916.		1917.		1918.		1919.		1920.	
New Brunswick	1,074	49,817	1,074	49,883	1,043	49,483	1,018	42,050	917	38,634
Nova Scotia	2,064	123,058	2,010	119,805	1,948	124,517	1,965	158,100	1,709	152,130
Quebec	1,452	273,770	1,391	283,942	1,318	175,235	1,340	342,424	1,321	409,442
Ontario	2,116	328,531	2,079	311,283	2,064	312,865	1,986	320,065	1,793	313,875
Prince Edward Island	155	10,652	157	10,956	158	10,805	158	10,726	143	9,993
British Columbia	1,687	145,525	1,734	183,002	1,928	231,513	2,006	207,708	1,930	217,481
Manitoba	95	8,953	5	530	96	9,791	89	9,160	83	9,119
Yukon District	11	2,295	99	9,834	8	2,040	6	1,133	4	813
Saskatchewan	5	530	10	2,204	5	529	5	529	4	393
	8,659	943,131	8,559	971,438	8,568	1,016,778	8,573	1,091,895	7,904	1,151,880



SESSIONAL PAPER No. 21

COMPARATIVE STATEMENT of Vessels Built and Registered in the Dominion of Canada and their Net Tonnage during the Year ended December 31, in each Year from 1911 to 1920, both inclusive

Province.	1911.		1912.		1913.		1914.		1915.	
	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.
New Brunswick.	25	774	44	1,092	45	1,114	31	1,310	22	1,114
Nova Scotia	136	5,340	126	5,853	67	4,899	56	3,303	51	2,982
Quebec	30	2,726	49	5,744	62	8,667	51	6,753	49	7,790
Ontario	42	10,086	71	11,170	38	15,572	78	23,567	38	4,709
Prince Edward Island.	4	61	1	34	3	804	2	35	2	24
British Columbia.	98	7,781	128	10,617	128	9,000	97	5,867	79	2,057
Manitoba.	3	902	1	516	1	18	11	2,899	5	156
Yukon District.	1	66	.	.	.	.	.	.	.	.
Saskatchewan	339	27,736	420	31,886	344	40,161	327	43,246	246	18,832
Province.	1916.		1917.		1918.		1919.		1920.	
	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.	Vessels	Tons.
New Brunswick.	22	332	23	1,156	16	2,590	14	3,326	5	103
Nova Scotia.	65	7,661	86	14,781	110	27,831	163	43,877	87	15,440
Quebec	51	8,643	32	8,058	26	9,086	46	45,831	82	48,303
Ontario	26	5,507	21	3,949	48	10,098	37	10,858	14	3,004
Prince Edward Island.	.	.	.	.	4	78	5	507	4	270
British Columbia.	65	4,487	77	17,452	192	54,889	138	23,396	136	35,512
Manitoba	15	1,573	4	881	1	39	4	113	.	.
Yukon District.	.	.	.	.	.	.	.	.	.	.
Saskatchewan	244	28,303	243	46,277	397	104,611	407	127,938	329	102,779



REPORT OF B. H. FRASER, M.I.C.E., CHIEF ENGINEER

OFFICE WORK

Total plans for twelve months (April 1 to March 31, 1921) .. ..	2,033
Charts received and recorded .. .. .	110
Photographs received and recorded .. .. .	427
Specifications and bills of material written .. .. .	60
Notices to mariners issued (comprising 240 subjects) .. .. .	94

PUBLICATIONS

During the fiscal year 94 Notices to Mariners were issued covering 240 subjects. The following may be especially noted:—

Rules and regulations for navigating the Amherstburg and Livingstone channels in the Detroit river.

Pilotage regulations for the District of Halifax, N.S.

Pilotage regulations for the District of St. John, N.B.

List of stations and procedure to be used in connection with Radiotelegraph Direction Finding.

Information with regard to True Bearings in British Admiralty publications.

Description of improvements to navigable channels by dredging done by the Department of Public Works.

Notices relating to waters outside of Canada were issued covering items relating to Newfoundland, Atlantic and Pacific waters, of the United States, Panama Canal, as well as notices relating to transatlantic subjects.

The annual edition of the "List of Lights and Fog Signals," in three sections, was issued.

REMOVAL OF OBSTRUCTIONS TO NAVIGATION

Lunenburg Light .. .. .	A small craft named <i>Sweetheart</i> sank in the harbour and was subsequently removed by the owners.
Bear river, N.S. .. .. .	The bridge which was wrecked and formed an obstruction to navigation was removed by the Provincial Government.
Dalhousie, N.B. .. .. .	The tug <i>Gra Ligne</i> , which sank near the harbour, was removed by the owner.
Richelieu river .. .. .	The barge <i>Bengalore</i> , which was wrecked one mile from Ste. Victoire wharf, was removed by the departmental diver.
Berthier Channel .. .. .	The barge <i>Glengarry</i> , which sank near the upper entrance to Berthier channel, was removed by the owners.
Iberville .. .. .	Wreck of dump scow in Richelieu river removed by Department of Public Works.
Port Dover, Ont. .. .. .	Hulk of old vessel removed by the owners, W. F. Kolbe & Co.
Port Weller .. .. .	Steamer <i>Muriel W</i> , which sank at outer entrance of basin, was removed by the Department of Railways and Canals.

MAINTENANCE AND REPAIRS TO WHARVES

The following is a list of wharves where repairs were attended to by this branch:—

Nova Scotia—	New Brunswick—	Prince Edward Island—
Brooklyn,	Annapolis Royal, N.S.	Bay view,
Dartmouth,	Hampton,	Charlottetown,
Digby,	Little river,	China point,
Granville centre,	Matthews cove,	Montague,
Isaacs harbour,	St. John,	Souris,
Ogilvie wharf,	St. Martins.	Sturgeon wharf.
Peters Island bar		
Westport.		



SESSIONAL PAPER No. 21

MAINTENANCE AND REPAIRS TO WHARVES—*Concluded*

<i>Ontario—</i>	<i>Quebec District—</i>	<i>British Columbia—</i>
Aylmer,	Anse St. Jean,	Powell river,
Kenora,	Matane,	Prince Rupert.
Midland,	Percé,	
Prescott,	Rivière Ouelle,	
Roches point,	Roberval,	
Rosseau,	St. Alphonse,	
Sault Ste. Marie,	Ste. Irénée.	
Scudder,		

ICE-BREAKING

The five-year contract with the Great Lakes Transportation Company, to keep the harbours at the head of lake Superior open for navigation until the 17th December in each year, and to open them in the spring, as soon as the canal at Sault Ste. Marie is open for navigation, is still in force.

NOVA SCOTIA

NEW AIDS TO NAVIGATION

Light Station	Nature of Work
Sauls island.....	Establishment of an unwatched light.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Cap Rond.....	Repairs to tower, dwelling and outbuildings.
Chebucto head.....	Repairs to boathouse.
Dartmouth	Transforming bell buoy superstructure from bell to clapper type.
"	Provision of 10-5½ ft. conical buoys.
"	Provision of 10-4 ft. can buoys.
Dover.	Repairs to tower.
False passage.....	Re-erection of beacon.
George island.....	Repairs to dwelling and construction of new cistern.
Glace bay.....	Construction of walk from lighthouse to the shore.
Harbour island.....	Provision and installation of Aga light.
Hobson island.....	Provision and installation of Aga lantern and 4th order lens.
Liscomb island.....	Repairs to tower, erection of boathouse and slipway.
Little Hope.....	Repairs to protection work.
Mainadieu.....	Repairs to dwelling.
Mary Joseph.....	Repairs to breakwater.
Mauger beach....	Repairs to breakwater and lighthouse.
Owls head.....	Boathouse moved and construction of slipway.
Sydney bar.....	Repairs to foundation.
Three top island.....	Repairs to dwelling.
Westhaver.....	Light replaced by an unwatched light using the Aga system.

NEW BRUNSWICK AGENCY

NEW AIDS TO NAVIGATION

Spencer island.....	Provision and installation of fog bell.
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CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Bunker island, N.S.....	Repairs to lighthouse and installation of 4th order lens.
Cape D'Or.....	Construction of a road.
Cape Sharp, N.S...	Provision of an oil storage tank.
Cherry island.....	Installation of No. 4 Gamewell mechanism.
Digby Gut, N.S.	Weight box extended to increase the length of run of fog bell and existing box renewed.
Gannet rock.....	Provision of an oil storage tank.
"	Repairs to low water landing and renewal of concrete blocks.
Grand passage.	Installation of a larger bell with engine.
"	Apparatus improved by the installation of a 5th order 360° lens, and Duplex lamp, showing a red light.



12 GEORGE V, A. 1922

CHANGES AND IMPROVEMENTS IN EXISTING AIDS—*Concluded*

Lightstation	Nature of work
Green island, N.S.....	Repairs to walk, making steps; dwelling shingled, etc.
Grindstone island.....	Provision of an oil storage tank.
Long Eddy point.....	Provision of an oil storage tank.
Machias Seal island	Repairs to tramway and dwelling.
"	Provision of an oil storage tank.
Midjie bluff....	Installation of an unwatched light.
Musquash	Installation of improved Reliance clock.
Partridge island.....	Repairs to roof of fog alarm building, coal shed, and repairs to reservoir.
St. John.....	Repairs to wharf and buoy shed and other sheds.
"	Six submarine bell buoy floats, placing mooring eyes, etc.
Swallowtail .	Fog bell moved to more suitable location.
Tiner point	Installation of new type F diaphone to replace E instrument.
Tongue shoal.....	Installation of sun valve.
Yarmouth, N.S.....	Installation of a trihedron.

## PRINCE EDWARD ISLAND AGENCY

## NEW AIDS TO NAVIGATION

East river.....	Establishment of two range lights.
Grand Etang.....	Erection of pole with shed at base to form the back light of a range.
Little Sands.....	Establishment of wharf light.
Richibucto cape....	Erection of range pole lights with sheds at base.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Belle isle, N.E.....	Installation of new galvanized iron pipes.
Cape Bauld.	The steam fog alarm plant replaced by an oil plant, and minor repairs.
Cape Ray	Steam plant replaced by an oil plant.
Escuminac, N.B. ....	Repairs to tower.
Flat island, P.Q. ....	Installation of improved Reliance clock.
Henry island ...	Installation of double flashing reflector and 35 m/m burner.
Murray harbour.....	Ballast for protection work.
Pictou, W. end, N.S.....	Installation of double flashing reflectors and Canteloupe clock with 35 m/m oil vapour burners.
Fort Bordon.....	Position of range lights changed.
St. Louis Gully	Erection of range pole lights.
St. Mary Island.....	Installation of compressors and 10 h.p. engines.

## QUEBEC

## NEW AIDS TO NAVIGATION

Lamék.....	Establishment of wharf light using pressed lens lantern.
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## CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Cap au Corbeau .	Repairs to dwelling and tower.
Cape Salmon.....	Provision and installation of Reliance clock.
Caribou ..	Repairs to foundation of front light.
Lamé point	Repairs to fog alarm building and coal shed.
Fox river.....	Back light moved to new site.
Heath point.....	Repairs to road.
Ile au Marteau	Repairs to chimney and fog alarm building.
"	Installation of duplicate 10 h.p. engines.
Little Belledune, N.B	Protection work.
Natashkwan...	Installation of a Reliance clock.
Paspébiac. .	Moving shed, repairs to foundation of tower and shelter shed.
Péroquet ..	Installation of duplicate 10 h.p. engines.
Pointe des Monts....	Winter sashes for fog alarm building.
Quebec ...	Alterations and additions in connection with the re-occupying of part of stores building.
Riviere a la Martre.....	Air tank placed outside of building and used for storing oil.
Valin river.....	Repairs to foundation of front lighthouse and construction of wooden trestle.
West point Anticosti.....	Repairs to lightstation.



## • SESSIONAL PAPER No. 21

MONTREAL DISTRICT  
NEW AIDS TO NAVIGATION

Legislation	Nature of Work
La Parade.....	Erection of range lights, front light on a combined ice-resisting concrete pier and tower back, a four section steel skeleton tower, showing catoptric light.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Calvaire.....	Front light moved to new location.
Cape Madeleine.....	Lighthouse moved to a new site.
Gentilly.....	Installation of a temporary light.
Ile de Grace.....	Repairs to back light.
Ile Ronde.....	Installation of 30" reflector.
Ile Ste. Therese.....	Protection work upper range front light.
Lotbiniere.....	Erection of steel skeleton tower, and reinforced concrete foundation pier.
Montreal agency.....	Provision of six steel ice buoys.
".....	New mast for scow <i>Lenore</i> .

## ONTARIO

## NEW AIDS TO NAVIGATION

Walpole island.....	Erection of two Aga lights on wooden piles carried out by A. Williston, contractor.
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## CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Bar point lightship.....	Lightship sheathed with iron plates and minor improvements.
Bass rock.....	Erection of day beacon.
Bois Blanc.....	Tower repointed.
Brighton.....	Reconstruction of outer range light.
Caribou island.....	Repairs to wharf.
Corunna.....	Protection work.
Kingsville.....	Repairs to back range lighthouse.
Limekiln crossing.....	Repairs to foundation.
Mohawk island.....	Repairs to tower and dwelling.
Otter island.....	Construction of fog alarm building, provision and installation of oil engines and diaphone plant.
Parry Sound agency....	Repairs to diving apparatus.
Scow <i>Parry Sound</i> ....	Repairs to hull and capstan.
Pelee passage.....	Repairs to base of iron tower.
Port Arthur.....	Provision of ruby chimneys.
Port Colborne.....	Space between lighthouse tower and fog alarm building converted into a room.
Port Maitland.....	Fog alarm improved by installation of 3" diaphone and erection of electrically lighted range lights and electric fog bell.
Prescott.....	Construction of 6 standard gas and bell buoy superstructures.
".....	Construction of 4 gas and bell superstructures and provision of 4 bells.
".....	Experimental submarine bell mechanism.
".....	Experimenting with Chanteloupe clock mechanism as bell striker.
".....	Painting and overhauling engine of <i>Marafiscan</i> .
Red Rock.....	Construction of concrete boat runway.
Rondeau.....	Repairs to lightkeeper's dwelling.
Thames river.....	Repairs to tower.
Western islands.....	Repairs to platform of tower and gully bridged between dwelling and fog alarm building by concrete walk.

## VICTORIA AGENCY, B.C.

## NEW AIDS TO NAVIGATION

Cyril rock.....	Installation of Aga stake light.
Franklin River.....	Acetylene gas light on five pile dolphin.
Lewis point.....	Erection of an unwatched light.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Arrowhead.....	Beacon lighted by an Aga apparatus.
Enterprise reef.....	Concrete beacon rebuilt.
First Narrows.....	Repairs to protection work.
Lennard island.....	Repairs to tower fog alarm building, dwelling, etc.
Northside range.....	Structure rebuilt and lantern replaced.
Trial island.....	Repairs to roof of lighthouse.
Victoria.....	Submarine bell buoy float transformed to take Aga equipment.



PRINCE RUPERT AGENCY, B.C.  
NEW AIDS TO NAVIGATION

Lightstation	Nature of work
Striae island. . . . .	Erection of a gas beacon.
Triple island. . . . .	Erection of a combined reinforced concrete lighthouse, fog alarm and dwelling by contractor J. H. Hilditch.
CHANGES AND IMPROVEMENTS IN EXISTING AIDS	
Prince Rupert.....	Erection of two double dwellings for Agency employees, and the installation of electric wiring and fittings.

COMMISSIONER OF LIGHTS' BRANCH

REPORT OF J. G. MACPHAIL, B.A., B.Sc., COMMISSIONER OF LIGHTS

The principal work performed during the fiscal year ended March 31, 1921, has been an extension of the buoy and beacon services, together with the maintenance of lights and other aids to navigation throughout the Dominion, and the maintenance and inspection of public wharves. The operations of this branch are set forth in tabular form in two inclosures.

INCLOSURE No. 1.—Statement, by districts, showing the number of lights of the several orders, lightships, lightkeepers, fog signals, buoys, submarine bells, etc.

	1st order lights	2nd order lights.	3rd order lights	4th order lights	5th order lights	6th order lights	7th order lights	Gas beacons	Pressed lens lights & other minor types.	Catoptric lights	Electric lights	Total.	Lightships	Lightkeepers	Diaphones	Fog guns and bombs	Fog horns and trumpets
New Brunswick		4	3	24	21	26	55	2	8	12	6	161	1	164	24	1	1
Nova Scotia.....	3	3	8	32	15	20	39	3	13	44	5	185	1	173	17	1	...
Prince Edward Island.	2	6	9	33	5	11	41	4	11	107	2	231		157	12	1	...
Quebec.....	3	1	11	20	11	17	43	6	23	87	15	237	4	190	21	4	...
Hudson Bay and Strait. . .								10				10					...
Montreal..				7	7	7	19	5	26	159	7	237		158			...
Prescott.....			3	14	5	6	18	20	5	9	2	82		44	10		...
Parry Sound.....		5	10	23	14	11	53	33	32	62	21	264	2	148	25		...
Kenora.....							3		12	12	2	9		6			...
Manitoba.....				2	3		4					16		10			...
Victoria...	3	1	3	7	8	2	12	53	1	5	1	16		10			...
Prince Rupert.....	1		3	3	1		3	29	10	4	18	121	1	66	19		...
									2	3		45		14	6		...
Total.....	12	20	50	165	90	100	290	165	133	494	79	1,598	9	1,130	134	7	1

	Fog whistles	Sirens	Fog bells	Hand fog horns	Hand fog bells	Total fog signals	Fog signal stations only	Gas buoys	Gas and whist- ling buoys	Gas and bell buoys	Whistling buoys	Bell buoys	Submarine bell buoys	Total gas and signal buoys	Lightship sub- marine bells	Total sub- marine bells	Lighted spar buoys, floats, and dolphins	Unlighted buoys.	Stakes, bushes and balises	Unlighted tri- pods, floats, dolphins, spin- dles & beacons
New Brunswick.	1		10	22		59	7	3	13	3	2	27		54	1	1		573	492	63
Nova Scotia..	1		2	44		65	2	6	20	10	16	44	3	99	1	4		1,000	12	13
Prince Edward Island.....		1		9		23		4	4	4	4	12		28				891	1,563	6
Quebec....	4			23	4	56	1	61		2		1	1	71	3	4	1	280	140	41
Hudson Bay and Strait.																				
Montreal								100						100			3	557	170	254
Prescott.....			3	5		18		57		1		1		59			1	531		5
Parry Sound	2		4	31		62		35	4	11		2		52	1	1	28	552	39	50
Kenora																		302		
Manitoba				4		4												35		
Victoria.....			11	5		35	1	1	4	3	2	3		13	1	1	16	172		85
Prince Rupert...			3	5		14	2	2	7	2				11				32		25
	8	1	33	118	4	336	13	249	52	42	30	90	4	467	7	11	42	5,018	2,416	548



## SESSIONAL PAPER No. 21

INCLOSURE No. 2.—Statement, by localities, giving the number of unlighted buoys, stakes, bushes, balises, tripods, floats, dolphins, spindles and beacons maintained throughout the Dominion during the fiscal year ended March 31, 1921.

## NEW BRUNSWICK DISTRICT

Locality and Number of Stakes, Bushes, etc.	No. of buoys	Locality and Number of Stakes, Bushes, etc.	No. of buoys
Advocate Harbour, N.S.	9	Letite, 1 spindle	
Alma, Little Salmon river, N.B.	3	Letite, L'Etang and Bliss Harbour, N.B.	14
Amherst basin, approaches to, N.S.	4	Little Wood island	1
Apple river, N.S.	8	Lorneville, N.B., 1 spindle	1
Argyle river and sound, N.S.	10	Magaguadavio, N.B.	13
Avon river, N.S.	4	Man O'War rock, L'Etang harbour, N.B.	2
Bear river, N.S.	7	Maquapit and French lakes, N.B., 57 stakes	13
Beaver Harbour, N.B.	4	Mink island, L'Etang harbour, N.B.	1
Big Duck island, Grand Manan	1	Musquash, N.B.	7
Blacks Harbour, N.B.	3	Old Man rock, N.S.	1
Bliss island, N.B.	1	Old Woman rock, N.S.	1
Brier island, N.S.	1	Owls head, N.S.	1
Buck rock, Grand Manan	1	Ox head ledges, N.B.	3
Calf island bay, N.S.	5	Parrsboro, N.S.	6
Campobello, N.B.	10	Pea point, L'Etang harbour, N.B.	1
Chambers rock, N.B.	1	Pease island, N.S.	1
Chamcook harbour entrance, N.B.	1	Petitcodiac river	12
Chance Harbour, N.B.	2	Pubnico, N.S.	21
Chebogue, N.S.	1	Quaco, N.B.	1
Clark Harbour, N.S.	18	Roaring Bull rock, N.S.	1
Cockerwitt pass and Woods Harbour, N.S., 1 spindle	18	Robinsons ball station, Wood Harbour, N.S.	2
Cumberland basin, N.S.	2	St. Andrews, N.B., 3 stakes	17
Deadman's head, L'Etang harbour, N.B.	1	St. Croix, N.B.	8
Deer island, N.B., 12 spindles in vicinity of island		St. John harbour, N.B.	3
Digby and Annapolis, N.S.	17	St. John river, N.B., 150 stakes and bushes	87
Digdequash, N.B.	6	Salmon river, N.B., bushing	15
Dipper Harbour, N.B.	5	Schooner rock, N.S.	1
Dochet island, St. Croix river	1	Scotchtown, N.B.	6
Freeport, N.S., 1 beacon	3	Shag Harbour, N.S.	17
Goose bay, N.S., 35 stakes	8	Shampiers wharf, N.B., 15 stakes	2
Grand lake, N.B., bushes	32	Shulee, N.S.	8
Grand Manan, bay of Fundy, 2 spin- dles, 1 beacon	17	Stay point, Lepreau river	1
Grand passage, N.S., 2 spindles	5	Tusket river, N.S.	9
Grassy island, St. John river, 18 stakes	7	Tusket Wedge, N.S., 3 spindles	17
Gull ledge, N.S.	1	Tynemouth creek, N.B.	4
Hatfield point, St. John river, 60 bushed stakes	1	Walton harbour, N.S.	1
Indian point bar channel, Grand lake, 10 bushed stakes	3	Washadamoak lake, N.B., 144 bushes	2
Johns ledge, N.S.	1	West isles, N.B., 4 spindles	23
L'Etang, N.B., 1 spindle		Weymouth, N.S.	20
		Yarmouth, N.S., 34 dolphins	7

## NOVA SCOTIA DISTRICT

Arichat, West Arichat and Janvrin, C.B.	19	Canso harbour entrance, N.S.	3
Barrington, N.S., 11 dolphins	44	Cape Negro and Northeast Harbour, N.S.	17
Beaver Harbour, N.S.	8	Chester and Gold river, N.S.	28
Beaver island, Nova Scotia, south- east coast	1	Chezzetcook and Petpeswick, N.S.	10
Beaver narrows, C.B.	2	Christmas island and Barra strait, C.B.	11
Big Lorraine (Lorembec harbour), C.B.	3	Clyde river, N.S.	5
Birchtown, N.S.	5	Coddle Harbour, N.S.	6
Black rock shoal, off Dover, N.S.	1	Cooks Cove (Toby Cove), N.S.	4
Blandford, N.S.	5	Country Harbour, N.S.	2
Boulaceet, Gillies point, C.B.	1	Crow Harbour, N.S.	3
Canso and St. Andrews passage, N.S., 20 winter buoys	30	Denny river, C.B.	3
		Descousse and Lennox passage, C.B., 5 winter buoys	29



INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—Continued  
NOVA SCOTIA DISTRICT—Concluded

Locality and Number of Stakes, Bushes, etc.	No. of buoys	Locality and Number of Stakes, Bushes, etc.	No. of /buoys
Devereux shoal, off Betty island, N.S.	1	Pennant Harbour, N.S.. . . . .	11
Dover, N.S.. . . . .	7	Petitdegrat, C.B., 6 winter buoys..	18
Dover harbour entrance, Gannet shoal, N.S.. . . . .	1	Petpeswick inlet, N.S.. . . . .	1
East bay, Bras d'Or, C.B.. . . . .	5	Pollock shoal, off West Ironbound island, N.S.. . . . .	1
East Dover, N.S.. . . . .	3	Pope Harbour, N.S.. . . . .	4
Eskasoni, C.B.. . . . .	6	Port Bickerton, N.S., 3 winter buoys..	5
Fourchu harbour, C.B.. . . . .	15	Port Felix, N.S., 1 staff.. . . .	11
Gegoggin, N.S.. . . . .	7	Port Latour, N.S., 1 spindle.. . .	16
Glace bay, C.B.. . . . .	6	Port L'Hebert, N.S.. . . . .	8
Great Bras d'Or, C.B.. . . . .	7	Port Medway, N.S.. . . . .	6
Guysborough, N.S.. . . . .	5	Port Morien, C.B.. . . . .	1
Habitants bay, C.B.. . . . .	4	Port Mouton, N.S.. . . . .	9
Halifax, N.S.. . . . .	19	Pringle Harbour, C.B.. . . . .	6
Harrigan Cove, N.S.. . . . .	3	Prospect, Lower, N.S.. . . . .	10
Hautfond shoal, off cape Hogan, C.B.	1	Prospect, Upper, N.S.. . . . .	4
Indian Harbour, N.S.. . . . .	4	Ram rock, Jordan bay, N.S.. . . .	1
Ingonish, South Bay, C.B.. . . . .	9	River Bourgeois, C.B.. . . . .	6
Isaac Harbour, N.S., 9 winter buoys..	13	Rose Bay, lower, N.S.. . . . .	6
Jeddore, N.S., winter buoys.. . . .	11	Roseway, N.S.. . . . .	5
Johnson Harbour, C.B.. . . . .	5	St. Ann, C.B.. . . . .	12
Ketch Harbour, N.S.. . . . .	6	St. Margaret bay, N.S.. . . . .	6
Kieley Cove, Blind bay, N.S.. . . . .	4	St. Mary river, N.S., winter buoys..	11
Lahave, N.S.. . . . .	9	St. Mary river to Sherbrooke, N.S..	18
Lahave river, N.S.. . . . .	6	St. Peter bay, C.B., 4 winter buoys..	16
L'Ardoise, C.B.. . . . .	5	St. Peter inlet, C.B.. . . . .	12
Larry river, N.S., 7 stakes.. . . .	3	Sambro, N.S.. . . . .	29
Liscomb, N.S., winter spars.. . . .	7	Shad Bay, N.S.. . . . .	4
Little Bras d'Or harbour, C.B.. . . .	12	Shag bay, N.S.. . . . .	8
Little Dover, N.S.. . . . .	9	Sheet Harbour, N.S., 5 winter buoys ..	9
Little Liscomb harbour, N.S.. . . .	4	Shelburne, N.S., 3 winter spars.. .	9
Little Lorembec (Little Lorraine), C.B.. . . . .	5	Ship Harbour, lower, N.S., 6 winter buoys.. . . . .	11
Little Narrows, C.B.. . . . .	10	Slaughenwhite ledge, Hubbard Cove, N.S.. . . . .	1
Liverpool, N.S.. . . . .	10	Sober island to Ecum Secum, N.S.. . .	22
Lockeport, N.S.. . . . .	14	Spry Bay, N.S.. . . . .	2
Louisburg, C.B., 6 winter buoys.. .	8	Stoney island, Baddeck, C.B.. . . .	1
Lunenburg, N.S.. . . . .	8	Strait of Canso, N.S.. . . . .	1
Lunenburg, back cove, N.S.. . . . .	9	Sydney harbour, C.B.. . . . .	8
Lunenburg, middle south, N.S., 6 win- ter buoys.. . . . .	16	Tancook island, N.S.. . . . .	3
Mahone bay, N.S., 1 beacon.. . . .	12	Tangier, N.S.. . . . .	7
Mainadieu, C.B.. . . . .	5	Terence Bay, N.S.. . . . .	3
Marble Mountain, C.B.. . . . .	5	Three Fathom Harbour, N.S.. . . .	5
Marie Joseph and Ecum Secum, N.S., 11 winter buoys.. . . . .	16	Tor Bay, N.S.. . . . .	21
Martins Brook, N.S.. . . . .	6	Volgers Cove, N.S.. . . . .	6
McKinnon Harbour, C.B.. . . . .	6	Walkerville, C.B. (Inhabitants Har- bour).. . . . .	3
McNab Cove, C.B.. . . . .	2	Washaback river, C.B.. . . . .	7
McVarish shoal and Campbell point, Bras d'Or, C.B.. . . . .	4	West bay, C.B.. . . . .	5
Monsillier passage, C.B., 4 stakes.. .	6	West bay, C.B. (Smith island).. . .	1
Musquodoboit, N.S.. . . . .	15	West Chezzetcook, N.S.. . . . .	7
New Harbour, N.S.. . . . .	1	West Dublin, N.S.. . . . .	12
Orangedale, C.B.. . . . .	3	Whitehaven, N.S., 5 winter buoys..	8
Orpheus, off Green island, N.S.. . . .	1	Whycocomagh, C.B.. . . . .	4

PRINCE EDWARD ISLAND DISTRICT

Aldouane, N.B., 42 bushes.. . . .	5	Bay Fortune, P.E.I.. . . . .	3
Amherst harbour, Magdalen islands..	8	Beach Point, P.E.I.. . . . .	3
Baie du Vin, Huckleberry gully and channel, N.B., 44 stakes and bushes	18	Belle River, P.E.I.. . . . .	3
Bale Verte and Port Elgin N.B., 30 stakes.. . . . .	6	Black Brook, Miramichi river.. . . .	3
Bartibog and Black rivers, N.B., 12 bushes.. . . . .	1	Brae harbour, P.E.I.. . . . .	5
		Brudenell river, P.E.I.. . . . .	5
		Brule, N.S.. . . . .	9
		Buctouche, N.B., 34 stakes.. . . .	22



## SESSIONAL PAPER No. 21

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Continued*PRINCE EDWARD ISLAND DISTRICT—*Concluded*

Locality and Number of Stakes, Bushes, etc.	No. of buoys	Locality and Number of Stakes, Bushes, etc.	No. of buoys
Buctouche river, N.B., 260 bushes.. ..		Murray Harbour and rivers, P.E.I., 25 stakes, 1 winter spar.. ..	32
Cape Jack ledges, N.S.. .. .	1	Napan river, N.B., 24 bushes.. ..	3
Cardigan, Lower, P.E.I., 2 winter buoys	7	Neguac, N.B.. .. .	19
Cardigan, Upper, P.E.I.. .. .	20	New London—French river, P.E.I., 15 stakes.. .. .	8
Caribou, N.S.. .. .	6	Northport, N.S.. .. .	12
Cascumpeque, P.E.I., 14 stakes.. ..	15	North river, P.E.I., 14 stakes.. ..	3
Charlottetown, P.E.I.. .. .	8	Orwell and Vernon rivers, P.E.I., 36 bushes, 4 beacons .. .. .	3
Chéticamp, N.S.. .. .	14	Pictou, N.S., number of bushes.. ..	11
Chimney Corner, C.B.. .. .	3	Pinette, P.E.I., 24 bushes.. .. .	5
Church rock, Magdalen islands.. ..	1	Pokemouche, N.B., bushes.. .. .	6
Cocagne, N.B., 30 stakes.. .. .	11	Port Hill, P.E.I.. .. .	12
Covehead, P.E.I.. .. .	3	Port Hood, C.B. 2 winter buoys.. ..	5
Crapaud, P.E.I.. .. .	11	Pownall, P.E.I., 10 stakes.. .. .	9
East river, P.E.I., 15 stakes, 8 bushes	14	Pugwash, N.S.. .. .	8
Egmont Bay, north, P.E.I., 19 stakes	9	Richibucto, N.B.. .. .	38
Egmont Bay, south, P.E.I., 13 stakes	3	Richibucto river, Rexton and Browns yard, N.B.. .. .	30
Entry island and Amherst island pass- age (Magdalen islands).. .. .	6	Rifleman reef, P.E.I.. .. .	1
Georgetown and St. Marys bay, P.E.I., 3 winter spars.. .. .	19	River John, N.S., stakes.. .. .	3
Goose and Palmer Harbours, P.E.I.. ..	5	River Phillip, N.S.. .. .	6
Grand Entry, Magdalen islands.. ..	17	Rollo Bay, P.E.I.. .. .	3
Grand Etang, C.B.. .. .	4	Rustico, P.E.I., 30 bushed stakes ..	6
Grandique, N.B., 30 stakes, 20 bushes	2	St. Charles river, N.B., 60 bushes.. ..	
Grand river (Boughton river), P.E.I., 80 bushed stakes, 1 beacon.. .. .	12	St. Louis, N.B. 70 bushes.. .. .	9
Grand river, off Cape Sixteen, Mal- peque bay, P.E.I.. .. .	8	St. Louis river, N.B., 54 bushes and stakes.. .. .	
Grand Tracadie, P.E.I.. .. .	4	St. Peter harbour, P.E.I., 6 stakes.. ..	5
Great Shemogue, N.B.. .. .	9	Sandy Hook, Magdalen islands.. ..	1
Grindstone reef, Magdalen islands	1	Savage Harbour, P.E.I.. .. .	2
Harbour au Bouche, N.S., 6 stakes..	4	Shediac, N.B.. .. .	19
House Harbour, Magdalen islands ..	11	Shippigan, N.B., 27 pickets 30 bushes, 1 beacon.. .. .	27
Judique C.B.. .. .	1	Souris, P.E.I.. .. .	4
Kouchibouguac and Black Lands gully, N.B., 150 bushes.. .. .	15	Stanley and Bayfield channel, South- west river, Clifton bridge, P.E.I., 14 stakes.. .. .	9
Little channel, P.E.I.. .. .	3	Summerside, P.E.I., 10 stakes.. .. .	10
Little Shemogue N.B., 2 poles.. ..	5	Tabusintac, N.B.. .. .	20
Mabou, C.B., stakes.. .. .	20	Tatamagouche, N.S., 46 bushed stakes	18
Malpeque and Darnley, P.E.I., 2 stakes	23	Terras shoal, P.E.I.. .. .	1
Margaree Harbour, C.B., 7 stakes.. ..	3	Tidnish, N.S., stakes.. .. .	5
Merigomish, N.S., stakes.. .. .	6	Tracadie, north gully, N.B., 100 bushes and stakes.. .. .	12
Meule rock, Magdalen islands.. ..	2	Tracadie, south gully, N.B., 30 bushes	5
Miminegash, P.E.I.. .. .	6	Wallace, N.S., 33 stakes.. .. .	11
Miramichi bay and river, 12 bushes, 12 winter spars.. .. .	40	West Point, P.E.I.. .. .	4
Miramichi bay, Grandon channel.. ..	20	West river, P.E.I., 65 stakes.. .. .	8
Miramichi river, northwest branch ..	14	Wood Island, P.E.I.. .. .	4
Miramichi river, southwest branch.. ..	9		
Miscouche, P.E.I.. .. .	1		
Montague river, P.E.I., 10 stakes.. ..	7		

## QUEBEC DISTRICT

Anse à Beaufile, P.Q.. .. .	1	Carleton point, P.Q.. .. .	1
Anse aux Gascons, P.Q.. .. .	1	Echourie rock (Serpent reef), P.Q..	1
Barachois de Malbaie, P.Q.. .. .	1	Fox river, P.Q.. .. .	1
Bathurst, N.B.. .. .	31	Grand Anse, N.B.. .. .	4
Beaudry shoal, Gaspé basin, P.Q.. ..	1	Gros-cap-aux-os, P.Q.. .. .	1
Beauport, P.Q.. .. .	3	Lake St. John, Ashuapmouchouan river, 30 balises.. .. .	7
Bonaventure, P.Q.. .. .	11	Lake St. John, Mistassini river, 60 balises.. .. .	12
Cap Chat, P.Q.. .. .	1	Lake St. John, Peribonka river and Roberval, 35 balises.. .. .	16
Cape Cove, P.Q.. .. .	1	Little River East, P.Q.. .. .	1
Cape d'Espoir, P.Q.. .. .	1		
Caraquet, N.B.. .. .	16		
Caraquet to Misonette, N.B.. .. .	3		



INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—Continued

QUEBEC DISTRICT—Concluded

Locality and Number of Stakes, Bushes, etc.	No. of buoys	Locality and Number of Stakes, Bushes, etc.	No. of buoys
Little River West, P.Q.. . . . .	1	Portneuf-en-Bas, P.Q.. . . . .	9
Little Shippigan (Miscou gully), N.B..	4	Quebec harbour.. . . .	2
Maria, P.Q.. . . . .	2	Restigouche river and Chaleur bay.. .	22
Matane, P.Q.. . . . .	2	River St. Lawrence ship channel, 33	
Miscou, N.B.. . . . .	8	beacons, 8 spindles, 7 steel winter	
Moisie river, P.Q.. . . . .	2	spar buoys.. . . .	31
Natashkwan, P.Q.. . . . .	4	Ste. Anne river, P.Q.. . . . .	1
New Richmond, P.Q.. . . . .	3	St. Godfroy, P.Q.. . . . .	1
North channel, Orleans island, P.Q..	13	St. Michel de Bellechasse, P.Q.. .	4
Nouvelle roads, P.Q.. . . . .	2	St. Simon bay, N.B., 15 stakes.. .	6
Paspebiac, P.Q.. . . . .	1	St. Thomas de Montmagny, P.Q.. .	8
Percé, P.Q.. . . . .	2	Saguenay river, vicinity of Chicoutimi,	
Petit Rocher, N.B.. . . . .	1	P.Q.. . . . .	33
Point St. Peter, P.Q.. . . . .	1	Saguenay river, Ha Ha bay.. . . .	1
Port Daniel, P.Q.. . . . .	1		

MONTREAL DISTRICT

Ottawa river district.. . . .	85	day beacons.. . . .	
Richelieu rapids, bushes . . . . .		St. Maurice river, Grandes Piles to	
Richelieu river.. . . .	68	Latuque, P.Q., 106 day beacons..	74
Rideau river, 101 floats, 25 tripods..		Yamachiche river, P.Q., 30 balises, 4	
River St. Lawrence.. . . .	319	day beacons.. . . .	
Rivière des Prairies P.Q.. . . . .	11	Yamaska river, P.Q., 60 balises, 6 day	
St. Francis river, P.Q., 80 balises, 12		beacons.. . . .	

PRESCOTT DISTRICT

Bay of Quinté.. . . .	16	Lake St. Francis.. . . .	31
Cataragui.. . . .	3	Murray canal and Presqu'île bay.. .	20
Kingston.. . . .	9	Napanee river.. . . .	14
Lake Ontario, Melville shoal.. . . .	1	Picton harbour.. . . .	6
Lake Ontario, N.E. of Snake island..	1	River St. Lawrence, 5 beacons.. . .	82
Lake Ontario, S.E. end of Snake island		Telegraph narrows.. . . .	10
shoal.. . . .	1	Trent canal (maintained for this De-	
Lake Ontario, S.W. end Snake island		partment by Department of Railways	
shoal.. . . .	1	and Canals).. . . .	317
Lake Ontario, off Long point, Wolfe		Trenton.. . . .	15
island.. . . .	1	Whitby.. . . .	5
Lake Ontario, E. of Presqu'île light...	1		

PARRY SOUND DISTRICT

Ann Long bank, Georgian bay.. . . .	1	Detroit river.. . . .	30
Bar point, Georgian bay.. . . .	1	Fitzroy Harbour, Ont.. . . . .	19
Bad Neighbour shoal, entrance to		Fort William, lake Superior.. . . .	15
Georgian bay.. . . .	1	Goderich, lake Huron.. . . .	7
Bernard rock, Georgian bay.. . . .	1	Jackson shoal, Georgian bay.. . . .	2
Blind River, North channel, lake		Kennedy bank, Georgian bay.. . . .	1
Huron.. . . .	6	Key Harbour channel, Georgian bay,	
Burke shoal, lake Superior.. . . .	1	6 beacons.. . . .	24
Byng Inlet channel, Georgian bay, 6		Killarney harbour, Georgian bay.. .	3
beacons.. . . .	27	Lake Couchiching and narrows, 11	
Cache Bay, lake Nipissing, 8 stakes..	11	bushes.. . . .	8
Campana shoal, Georgian bay.. . . .	1	Lake Simcoe.. . . .	5
Campbell rock, Georgian bay.. . . .	1	Lionshead harbour, Georgian bay.. .	1
Cape Hurd, lake Huron.. . . .	3	Little Current, North channel, lake	
Clapperton channel, North channel,		Huron.. . . .	27
Huron, 1 beacon.. . . .	8	Mary Ward ledges, Georgian bay.. .	4
Cloud Bay, lake Superior.. . . .	2	Meaford harbour, Georgian bay.. . .	3
Collingwood, Georgian bay.. . . .	13	Michipicoten island (Quebec harbour)	
Dawson rock, Georgian bay.. . . .	1	lake Superior.. . . .	6



## SESSIONAL PAPER No. 21

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Concluded*  
PARRY SOUND DISTRICT—*Concluded*

Locality and Number of Stakes, Bushes, etc.	No. of buoys	Locality and Number of Stakes, Bushes, etc.	No. of buoys
Midland and Victoria Harbours, Georgian bay.. . . . .	5	River St. Clair, middle ground.. . . .	1
Morden rock, Georgian bay.. . . .	1	River St. Mary and east end of lake Superior.. . . . .	19
Mutton island, lake Superior.. . . .	1	River Thames, lake St. Clair.. . . .	7
Northeast shingle, Georgian bay.. . .	1	Rondeau, lake Erie.. . . . .	6
Ottawa river, above Pembroke, Ont..	30	St. Joseph channel, lake Huron, 1 beacon, 5 winter buoys.. . . .	25
Owen Sound channel, Georgian bay..	4	Shebeshekong channel, Georgian bay, 22 day beacons.. . . . .	7
Parry Sound ship channel, 2 beacons..	20	Southampton, lake Huron.. . . . .	4
Parry Sound to Waubaushene, Georgian bay, inner channel.. . . .	116	South Baymouth, lake Huron.. . . .	6
Penetanguishene, Georgian bay.. . . .	12	Stokes bay, lake Huron.. . . . .	5
Pointe au Baril and Kennedy shoal, Georgian bay, 15 beacons.. . . . .	3	Sturgeon river, 20 stakes.. . . . .	3
Port Arthur, lake Superior.. . . . .	21	Victoria island, lake Superior.. . . .	3
Port McNicoll, Georgian bay.. . . . .	2	Wabuno channel, Georgian bay, 3 beacons.. . . . .	5
Port Rowan, lake Erie.. . . . .	10	Wingfield basin, Georgian bay.. . . .	4
River St. Clair, chenel Ecarte.. . . .	1		

## KENORA DISTRICT

Lake of the Woods.. . . . .	270	Wabigoon lake.. . . . .	27
Rainy lake and Rainy river.. . . . .	58	Winnipeg river, White Dog to Kenora	20
Shoal lake.. . . . .	17		

## MANITOBA DISTRICT

Black river, lake Winnipeg.. . . . .	6	Warrens landing, lake Winnipeg.. . .	12
Red river.. . . . .	17		

## VICTORIA DISTRICT

Active pass, 1 beacon.. . . . .	22	Mud bay, Serpentine and Nicomeck'l rivers, 3 beacons, 27 dolphins.. . .	13
Arrow lakes.. . . . .	10	Nanaimo harbour and Departure bay, 1 beacon.. . . . .	2
Baynes sound and approaches, 1 pile dolphin.. . . . .	1	Okessella channel, 3 beacons.. . . .	9
Broughton strait.. . . . .	6	Pender canal.. . . . .	1
Burrard inlet and Vancouver harbour, 1 beacon.. . . . .	13	Pitt river.. . . . .	1
Clayoquot sound, 3 beacons.. . . . .	2	Prevost channel.. . . . .	1
Colburne passage, Colburne channel..	4	Quatsino sound, 2 beacons.. . . . .	1
Courtenay river, 12 pile dolphins.. . .	2	Saanich arm.. . . . .	2
Esquimalt harbour, 1 beacon.. . . . .	38	Saanich inlet, 1 spindle, 1 beacon.. .	1
False narrows.. . . . .	2	Satellite channel, 2 beacons.. . . .	1
Fraser river.. . . . .	2	Shushartie bay, 1 beacon.. . . . .	1
Ganges harbour.. . . . .	7	Shute passage.. . . . .	6
Georgia strait, 2 beacons, 1 set range day marks.. . . . .	2	Sidney channel, 1 beacon.. . . . .	6
Haro strait, 1 beacon.. . . . .	2	Stuart channel and approaches, 4 beacons, 1 pile dolphin.. . . . .	2
Johnstone strait, 4 beacons.. . . . .	1	Sutil channel, 1 pile dolphin.. . . .	3
Juan de Fuca strait.. . . . .	1	Trincomali channel and Porlier pass, 5 beacons.. . . . .	1
Kokshittle arm, Kyuquot arm.. . . . .	7	Ucluelet harbour, 1 beacon.. . . . .	1
Kootenay lake, northwest arm.. . . .	2	Victoria harbour, 2 beacons.. . . .	
Malaspina strait, 3 beacons.. . . . .			

## PRESCOTT DISTRICT

Chatham sound, 1 beacon.. . . . .	6	Port Simpson.. . . . .	1
Fitzhugh sound, 1 beacon.. . . . .	1	Prince Rupert harbour, 1 beacon.. .	1
Grenville channel, 3 beacons.. . . . .	1	Queen Charlotte islands, 4 beacons..	2
Lama passage, 3 beacons.. . . . .	9	Seaforth channel, 3 beacons.. . . .	2
Metlakatla.. . . . .	3	Skeena river and passages, 5 beacons..	
Observatory inlet, 3 beacons.. . . . .	6	Tolmie channel, 1 beacon.. . . . .	
Porpoise harbour.. . . . .			



RIVER ST. LAWRENCE SHIP CHANNEL

REPORT OF V. F. W. FORNERET, B.A.Sc., SUPERINTENDING ENGINEER

GENERAL INFORMATION

The Ship Channel, for purposes of organization and details, has been divided into five divisions:—

	Statute Miles
Division 1—Montreal to Sorel.. . . .	45
Division 2—Sorel to Batiscan (not including lake St. Peter).. . .	36
Division 3—Lake St. Peter.. . . .	20
Division 4—Batiscan to Quebec.. . . .	59
Division 5—Quebec to the Traverse (South channel).. . . .	60
Total.. . . .	220

The South channel below Quebec having been completed to 30 feet at extreme low tide in 1912, the dredging to 35 feet at E.L. tide of the North channel, was commenced immediately and although good progress has been made, there still remains a great deal of work to be done before it is completed.

The Ship channel below Quebec divides into the North and South channels about opposite St. Jean (island of Orleans) and joins again below Goose cape. The distance from Quebec to Goose cape via North channel is 66 statute miles.

From Quebec to Three Rivers, 82 miles, there is practically no tide.

From Three Rivers to Batiscan, 20 miles, the tide can always be felt, but owing to uncertainty of time and height, it cannot be depended upon for navigation.

From Batiscan to Portneuf, 22 miles, during six hours out of twelve, half tide giving 1½ to 4 feet, may be taken advantage of by passing during those six hours.

From Portneuf to Quebec, 36 miles, there is a tide from 9 to 15 feet, giving tidal navigation for about nine hours out of twelve.

From Quebec to Crane island, 40 miles, the tide is 13 feet at Neaps and 18 feet at Springs, and as the channel is dredged to 30 feet at extreme low water, there is navigation, in this division, of from 43 to 48 feet at high tide or 36½ to 39 feet at half tide.

The river between Montreal and Quebec is particularly adapted for improvement. The water is almost free from matter in suspension which may deposit itself in excavated channels and fill them up. The river bottom is almost everywhere of such a character that when a cut is once made it remains unchanged. There are many difficulties such as hard material, strong currents, bad weather; but no dredging in the world can show better results, or more permanence.

DREDGING OPERATIONS, SEASON 1920

The department having again decided that on account of the existing conditions, it was advisable to carry on the dredging operations on the River St. Lawrence ship channel for the season of 1920, on the same curtailed scale as during the previous year, which consisted of 4 dredges, 1 rock cutter and attending plant, and working during the day time only. With such a comparatively small plant, progress could not be otherwise than slow and numerous contemplated improvements had again to be deferred until conditions improved.

Division 1—Montreal to Sorel

*Longueuil Curve (Montreal Harbour.)*—During the season of 1920 some work was done on this curve by two dredges for a short period, widening and deepening to 35 feet at E.L.W. of 1897. It is the intention to widen this curve on the north side



## SESSIONAL PAPER No. 21

(Forsyth shoal) in order to obtain a width of 850 feet. When this work is completed, it will be a great improvement to this part of the channel in the harbour. The dredged material is very hard, consisting of hard pan, some shale rock with stones and boulders, the latter having to be lifted by means of a stone lifter.

The total number of cubic yards removed amounted to 44,400, at a total cost of \$72,597.66 or \$1.63<sup>50</sup>/<sub>100</sub> cents per cubic yard.

*Division II—Sorel to Batiscan*

*Ste. Anne Curve.*—One dredge worked here for part of the season deepening the channel to 35 feet at E.L.W. of 1897, the material being clay and not difficult to dredge.

The total number of cubic yards removed amounted to 37,750, at a total cost of \$28,044.70, or .74<sup>29</sup>/<sub>100</sub> cents per cubic yard.

*Champlain Channel.*—This channel was carefully swept by the sweeping steamer early in the season to 30 feet at E.L.W. of 1897, and several sand bars were found to have formed since the previous season. A dredge was taken down and laid out to clean them up and was occupied on this work for several weeks. The obstructions were removed before the extreme low water period.

This is the only point in the ship channel between Montreal and Quebec where filling in of any importance occurs. The amount of material removed was 66,000 cubic yards at a total cost of \$46,474.08 or .70<sup>42</sup>/<sub>100</sub> cents per cubic yard.

*Division III—Lake St. Peter*

No work was done in this division during the season of 1920.

*Division IV—(Batiscan to Quebec)*

*Cap a la Roche Curve.*—Two powerful dredges were placed to work at Cap a la Roche during the greater part of the season, widening and deepening to 30 feet at E.L.W. of 1897. The widening on the north side of the channel is now completed, and dredged to 30 feet at E.L.W. There still remains a narrow strip at the lower end of the curve to be widened on the south side.

The work of deepening the south half of the channel to 30 feet at E.L.W. is well advanced. Owing to the uncompleted south half, the available depth in the channel is still 27½ feet at ordinary low water.

The total number of cubic yards removed during the season of 1920 amounted to 197,345, the material being hard shale rock, at a total cost of \$156,971.58, or .79<sup>54</sup>/<sub>100</sub> cents per cubic yard.

A considerable area has been broken and prepared for the dredges to remove next season, by the rock breaker.

*Division V—Quebec to Goose Cape (North Channel)*

The powerful sea-going hydraulic dredge No. 8 was laid out to work at the commencement of the season in the North channel, below Quebec, deepening to 35 feet at E.L.W.; the material consisting of sand, clay and many stones.

At the latter end of the month of July, dredge No. 8 went over to work in Beaujeu channel (South channel) for a few days to clean up some sand bars which had been found on examination with the sweeping steamer. When this work was finished, the dredge returned to the North channel and resumed operations where she had left off, and continued there for the balance of the season.

Dredge No. 8 removed 370,400 cubic yards during the whole season, at a total cost of \$142,046.83, or .38<sup>34</sup>/<sub>100</sub> cents per cubic yard.

The total number of cubic yards removed by the dredges during the season of 1920, amounted to 715,895 at a total cost of \$446,134.85, or .62<sup>84</sup>/<sub>100</sub> cents per cubic yard.







## SESSIONAL PAPER No. 21

## ACCIDENTS

The season of 1920 was comparatively free of serious accidents or marine casualties notwithstanding the unusually large number of vessels of large tonnage using the ship channel to Montreal, and none could be attributed to any fault of the channel.

## NEW AIDS SEASON 1920

Two new lighthouses were built at Ste. Anne de la Pérade on the same axis as the Cap Charles Channel Range of lights at Ste. Emélie which marks the centre line of Cap Charles channel. This gives a pair of lights at both ends which will be a great improvement and make navigation safer for this part of the channel, especially late in the autumn, when snow flurries very often obscure the Ste Emélie lights. The Gentilly Low light which was carried away by the ice last spring, was rebuilt. Some of the channel buoys were rearranged and a few additional ones placed.

The Black spar buoy M. 79 Ile au Boeuf, was replaced by a gas buoy.

Work was commenced in establishing a complete system of permanent beacons for placing and checking positions of channel buoys, and considerable progress was made on this work by the ship channel staff.

It is the intention to put up these beacons wherever it is possible. This new system will be found most useful in expediting the placing of the buoys in the spring. When it is completed, any good captain who is familiar with the river, will be able to place and check positions of the buoys quickly and correctly.

## ACCIDENTS IN THE ST. LAWRENCE RIVER, SEASON OF 1920

*Between Montreal and Quebec*

June 13.—Canada Steamship Lines steamer *Quebec* went aground close to the North transmission tower just above Three Rivers. Was refloated; apparently not damaged.

June 23.—Canadian Government steamer *Canadian Miner* stranded off Batiscau. Was refloated; slight damage.

July 16.—Tug *Margaret Hackett* with barge *Gladys H.*, westbound, collided with barge *Brookdale* in tow of steam barge *Maplehurst*, bound east. The tug sank south of English bank, lake St. Peter. Was raised.

September 12.—C.P.O.S. *Metagama*, on her way up to Montreal from Quebec, went ashore near foot of Ile Bouchard, north of the channel. Was refloated; no damage.

September 22.—Steam barge *Henry B. Hall*, of the George Hall Coal Company Limited, collided with the Canada Steamship Lines steamer *Montreal* when off Sorel, P.Q. Slight damage.

October 21.—Steamer *Georgie*, operated by the Canada Steamship Lines, inward bound for Montreal, went ashore just above Quebec on Fly bank, during dense fog. Was refloated; bottom damaged.

November 27.—Canadian Government steamer *Canadian Seigneur*, outward bound from Montreal, went aground on north bank at Curve No. 1, lake St. Peter. Was refloated; no damage.

*Quebec to Father Point*

May 13.—Steamer *Aticokan*, with barge *Thunder Bay* in tow, went aground on Madame island. Was refloated.

June 7.—Steam barge *Cuba*, in tow of tug *J. H. Hackett*, loaded with pulpwood, broke away from tug and foundered off Berthier-en-bas. Total loss.



12 GEORGE V, A. 1922

July 19.—Steam barge *John F. Morrow*, loaded with pulpwood from Little Saguenay for the Upper lakes, touched on Lark reef at entrance to the Saguenay river. Was refloated; bottom damaged.

August 14.—Steamer *Tunisian*, inward bound, collided with *Manchester Division*, also inward bound, while anchored in vicinity of Morin shoal, off Murray bay. Both vessels suffered damage.

August 28.—Steamer *J. S. McKee*, from Sydney, N.S., for Quebec, went ashore on Prince's shoal, abreast of Saguenay river. Operated by Canadian Merchant Marine. Was refloated; bottom damaged.

October 21.—Steamer *Chama*, outward bound from Montreal, went ashore on Bellechasse island. Was refloated; bottom badly damaged.

None of the above accidents can be attributed to any fault of the ship channel.

“MARINE SIGNAL SERVICE”

Signal stations have been established for the purpose of maintaining communication between ship and shore by means of flag signals.

This system of stations extends from St. John, N.B., Halifax, N.S., Cape Race, Nfld., and Belle Isle up the gulf and river St. Lawrence and through the Great Lakes to Sault Ste. Marie, Ont.

Following is a Complete List of Stations

EAST OF QUEBEC

Name of Station	Location	Nautical miles from Quebec	Means of Communication
R.—Quebec.....	Custom House.....	0	Telephone
X.—St. Jean d'Orleans.....	Shore end of wharf.....	14	"
Crane Island.....	Lighthouse.....	32	"
L'Islet.....	100 yards east of church.....	40	Telegraph
Cape Salmon.....	Lighthouse.....	81	Telephone and telegraph
Riviere du Loup.....	Shore end of wharf.....	92	Telegraph
Father Point.....	Shore end of wharf.....	157	"
Little Metis.....	Lighthouse..	175	"
Matane.....	".....	200	"
Pointe des Monts.....	".....	219	"
Cap Chat.....	".....	234	"
Riviere a la Marte.....	".....	260	"
Cape Magdalen.....	".....	294	"
Fame Point.....	".....	325	"
Cap des Rosiers.....	".....	349	"
Cap d'Espoir.....	".....	377	"
Point Maquereau.....	".....	400	"
West Point, Anticosti.....	".....	332	"
South West Point, Anticosti.....	".....	360	"
South Point.....	".....	415	"
Heath Point.....	".....	438	"
Point Escuminac, N.B.....	".....	462	"
Amherst Island, Magdalen Islands.....	".....	481	"
St. Paul's Island, C.B.....	Main station..	540	Telephone
Money Point, C.B., N.S.....	Lighthouse.....	537	"
Flat Point, N.S.....	".....	555	Telegraph
Cape Ray, Nfld.....	".....	553	"
Cape Race, Nfld.....	".....	826	"
Point Amour, Labrador.....	".....	673	Wireless telegraph
Belle-Isle.....	".....	734	"
Campdown, N.S.....	Near wireless station.....		Telephone
Halifax, N.S.....	The Citadel.....		"
Brier Island, N.S.....	Near lighthouse.....		"
Point Lepreau, N.B.....	Lighthouse.....		"
Partridge Island, N.B.....	".....		"
St. John, N.B.....	Custom House.....		"
Point Tupper, C.B.....			Telegraph
Seatar Island, C.B.....			"



## SESSIONAL PAPER No. 21

*Following is a Complete List of Stations—Concluded*

## WEST OF QUEBEC

Name of Station	Location	Nautical Miles from Quebec	Means of Communication
Bridge Station ...	Half-mile above Quebec Bridge on south shore	6	Telephone
St. Nicholas.....	At tidal semaphore.....	12	"
Portneuf....	In front lighthouse.....	31	"
Grondines.....	In old windmill tower.....	41	"
St. Jean Deschaillons.....	At tidal semaphore.....	45	"
Pointe Citrouille ..	In lighthouse. ..	55	"
Three Rivers.....	Upper end of Bureau wharf....	68	"
Sorel ..	Lower end of Government wharf .....	100	"
Bellmouth. .	About 500 ft. east Contrecoeur course, low light.....	110	"
Cap St. Michel.....	Abreast east end Ile des Lauriers.....	125	"
Longue Pointe.....	Pointe between wharves	134	"
R.—Montreal	92 Notre Dame St. East (La Sauvegarde Bldg.)	139	"

## WEST OF MONTREAL

R.—Lachine Canal.....	Lock No. 2.....	0	Telephone
R.—Lachine Canal.....	Lachine, in office Collector of Revenue.....	8	"
R.—Soulanges Canal	Cascades Point	21	"
R.—Soulanges Canal.....	Coteau Landing	33	"
R.—Cornwall Canal	Cornwall.....	62	"
R.—Galops Canal ..	Laft Lock.	99	Telegraph.
R.—Welland Canal	Port Dalhousie	298	"
R.—Welland Canal	Port Colborne	321	"
R.—Soo Canal.....	Sault Ste. Marie	820	"

Stations marked thus "R" are reporting stations only and are not equipped for signalling purposes. Stations marked "X" are closed temporarily.

## BRIEF SUMMARY OF WORK PERFORMED

1. Stations report movements of vessels to Montreal, Quebec, Sydney, Halifax or St. John.
2. Stations report weather conditions daily to Montreal, Quebec, Sydney, Halifax or St. John.
3. Montreal, Quebec and St. John publish daily bulletins giving weather and ice conditions and movements of vessels.
4. Montreal and Quebec publish daily bulletins showing the depth of water at various points in the river St. Lawrence ship channel.
5. The Signal Service offices at Montreal, Quebec and St. John are open day and night for the purpose of furnishing the public with information of shipping matters.
6. The telegraph system of the Department of Public Works on the north shore of the gulf of St. Lawrence report the movements of vessels engaged in the coasting trade in the Signal Service at Quebec.
7. The collectors of customs at all the seaports in the river and gulf of St. Lawrence, on the Atlantic coast and in the bay of Fundy report the arrival and departure of vessels engaged in the overseas trade.
8. Lloyd's agents at Quebec are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the province of Quebec.
9. Lloyd's agents at St. John, N.B., are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the Maritime Provinces.



12 GEORGE V, A. 1922

## IMPROVEMENTS CARRIED OUT AND CONTEMPLATED

The Signal Service at Halifax, St. John, North Sydney and Quebec, in the river and gulf of St. Lawrence and on the Great Lakes, and the telephonic and reporting service between Quebec and Montreal were combined on the 1st April, 1914, under the heading of Signal Service with the headquarters at Quebec. This consolidation has greatly facilitated the work and has led to many improvements.

An arrangement was made with the Department of Railways and Canals whereby their officials at the Lachine, Soulanges, Cornwall, Galops, Welland and Sault Ste. Marie canals report several times daily to the Signal Service at Montreal, giving movements of vessels bound to Montreal and points east of that port. This service has proved itself to be very useful, especially to the shipping interests of the port of Montreal, and will be extended from time to time as conditions may warrant.

The service at Halifax and St. John has been considerably improved during the past year, and further minor changes are in contemplation.

The signal mast at Sorel, P.Q., was replaced by a new one and the exterior of the building painted.

The Three Rivers Signal Station was painted on the outside and some minor repairs made to building.

It is proposed to overhaul and paint several of the stations during the season of 1921.

## ICE-BREAKING, 1920-21

## REPORT OF N. B. McLEAN, ENGINEER (RIVER ST. LAWRENCE SHIP CHANNEL)

The weather conditions during the winter season of 1920-21 were unusually mild. The river remained open from Quebec to a point three miles above the middle of No. 3 Curve in lake St. Peter, and from this point to Montreal was covered with ice.

On November 26, the *Lady Grey* went to Three Rivers to keep Port St. Francis open and to aid vessels coming down. No trouble was experienced as there was little or no ice, the last vessel passing outwards at Three Rivers on December 12. The *Lady Grey* proceeded to Quebec the same day and took up her station there for the winter's operations.

During the months of January and February two ice-jams occurred at Quebec bridge, both of which were successfully broken up by the *Lady Grey* and *Montcalm* working together. Had these jams not been cut out, the river instead of remaining open more than half way to Montreal would have been covered with ice from the bridge upwards, and as a result of this condition there would have been very grave danger of floods, with the river open for navigation at a much later date.

On two other occasions large battures, that came from the vicinity of Les Ecureuils and Cap Sante, were broken up in order to prevent them blocking at the bridge. Apart from this and the two ice jams already mentioned the ice-breakers had very little to do.

On March 22 the *Lady Grey* left Quebec and proceeded up to the lower edge of the ice in lake St. Peter. It was found that the ice was so light and soft that it was decided to do no work but to let nature take its course.

The next day, March 23, the lake ice began to move and by March 27 the river was clear from Montreal to Quebec.

Records which extend back for 80 years, to 1842, show that March 27 of this year is the earliest date of opening of the river during all that period. April 3, 1910, is the next earliest date in which the river was clear of ice; just one week later than this year.



## SESSIONAL PAPER No. 21

The *Lady Grey* left Three Rivers for Montreal March 28, but was delayed by a heavy snowstorm, arriving at Montreal only on March 29, when the ice-breaking operations were brought to a close for the season.

It has been customary for some years, after the ice-breaking had been finished below Montreal, for the *Lady Grey* to proceed to the foot of the Soulanges canal to break up the mass of frazil ice which forms there, but this year by the time the canals were opened this accumulation of frazil had disappeared and her services were not required.

AVERAGE DEPTH for each Month in the 27½-foot Channel (27½ feet at Ordinary Low Water) from Sorel Gauge during each year May to November

Year	May	June	July	Aug.	Sept.	Oct.	Nov.	Highest	Lowest
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
1892	31 0	31 9	31 6	30 6	28 9	28 3	28 3	33 6	27 3
1893	36 0	34 3	30 9	29 9	29 6	28 6	28 0	37 6	27 6
1894	34 6	31 9	31 0	29 2	28 3	28 9	29 0	36 0	27 7
1895	33 3	31 3	28 3	28 3	27 6	26 9	26 9	34 6	25 10
1896	33 6	30 6	28 9	28 0	27 6	27 9	29 0	37 0	27 4
1897	35 6	32 6	30 3	29 3	28 0	27 0	27 6	37 0	26 5
1898	31 6	30 9	29 8	28 2	28 2	28 3	28 6	32 1	26 9
1899	36 2	31 9	30 3	28 6	27 6	28 0	27 9	37 9	26 9
1900	33 6	30 9	30 6	29 6	28 1	28 9	29 2	35 9	27 4
1901	34 3	31 10	29 2	28 3	27 7	27 4	27 3	36 3	26 6
1902	32 2	32 2	32 2	29 4	28 1	28 1	29 0	34 1	27 6
1903	33 8	30 11	30 5	29 5	28 4	29 0	27 11	32 8	26 11
1904	36 3	34 5	30 9	29 5	29 5	30 4	29 3	37 4	28 1
1905	31 10	30 8	29 7	29 0	28 0	28 5	28 1	33 6	27 1
1906	32 4	31 5	29 3	27 11	27 3	27 4	27 6	33 3	26 9

AVERAGE DEPTH for each Month in the 30-foot Channel (30 feet at Extreme Low Water of 1897)

1907	37 1	35 9	34 3	32 10	32 4	32 9	33 7	38 3	31 10
1908	41 5	37 10	33 10	32 10	32 0	31 0	30 6	42 4	30 0
1909	40 6	37 6	33 10	33 2	32 7	32 4	31 6	42 7	30 11
1910	35 7	34 5	32 3	31 7	31 6	31 6	31 7	37 1	30 7
1911	36 6	34 6	32 1	31 3	30 9	30 2	30 3	38 1	29 4
1912	37 9	37 6	33 6	32 8	32 6	32 6	34 9	40 11	31 3
1913	37 0	34 4	32 8	31 10	31 6	32 1	32 7	38 6	31 1
1914	35 2	33 0	32 4	31 4	31 3	30 11	31 0	36 10	30 3
1915	34 7	32 6	31 6	31 4	31 1	30 11	30 8	37 4	30 1
1916	38 9	37 2	34 0	32 5	31 7	31 9	31 10	40 0	30 9
1917	36 8	36 6	34 10	33 6	32 3	32 6	33 0	38 2	31 3
1918	36 1	34 1	33 10	32 0	32 3	33 7	34 11	38 1	31 3
1919	39 7	36 7	33 5	32 4	32 3	32 8	33 5	41 1	31 3
1920	35 9	33 0	32 4	31 8	31 5	31 4	31 6	37 5	30 2



COST OF SHIP CHANNEL TO DATE  
TABLE showing the Total Cost of the Dredging and Plant and the Quantities  
Dredged to March 31, 1921

	Cost of Dredging	Expenditure for plant, shops, surveys, etc.	Quantities dredged
MONTREAL HARBOUR COMMISSIONERS, 1851 TO 1858	\$ cts.	\$ cts.	Cu. yds.
Dredging Montreal to Cap à la Roche to 27½ feet at O.L.W. and from Cap à la Roche to Quebec to 27½ feet at half tide.....	3,402,494 35	534,809 65	19,865,693
DEPARTMENT OF PUBLIC WORKS			
Dredging consisting of widening and cleaning up of channel, deepening Cap à la Roche to Cap Charles to 27½ feet at O.L.W. and dredging at Grondines, Lotbiniere and Ste. Croix, 1889, to June 30, 1899.....	829,583 08	486,971 79	3,558,733
PROJECT OF 1899			
Dredging Channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet and straightening—			
Fiscal year 1899-1900	100,191 01	265,270 78	1,107,894
“ 1900-1901.....	136,680 83	287,040 04	2,479,385
“ 1901-1902.....	185,429 80	479,731 47	3,098,350
“ 1902-1903.....	255,776 55	277,703 50	6,544,605
“ 1903-1904.....	276,958 59	308,765 44	4,619,260
DEPARTMENT OF MARINE AND FISHERIES			
<i>This includes the work below Quebec</i>			
Fiscal year 1904-05.....	311,087 93	277,225 69	2,716,220
“ 1905-06.....	431,768 30	317,327 37	4,047,530
“ 1906-07..... (July 1906- to March 31, 1907).....	302,677 37	275,003 61	3,001,010
“ 1907-08.....	478,209 66	417,390 22	4,831,875
“ 1908-09.....	497,686 03	340,861 86	5,896,737
“ 1909-10.....	572,950 71	321,375 80	6,354,285
“ 1910-11.....	576,838 02	488,248 88	5,600,050
“ 1911-12.....	588,697 60	499,799 58	4,509,904
“ 1912-13.....	663,229 74	430,107 86	6,929,344
“ 1913-14.....	895,235 59	426,018 12	6,140,867
“ 1914-15.....	1,036,846 65	327,975 71	6,225,143
“ 1915-16.....	976,622 03	771,760 03	8,462,957
“ 1916-17.....	1,030,550 60	437,469 62	7,800,555
“ 1917-18.....	618,399 69	136,765 97	2,517,376
“ 1918-19.....	350,152 92	79,797 45	628,060
“ 1919-20.....	422,107 05	132,747 20	517,305
“ 1920-21.....	446,134 85	151,422 99	715,895
	15,386,308 95	8,471,590 63	118,169,033

PROGRESS of Dredging Operations at date of Writing, the close of the Season 1920,  
30-Foot Project

Locality	Distance, English miles	Total length, requiring dredging	Length dredged in 1920	Total length of 30-foot channel dredged	Length yet to be dredged
Division No. 1 Montreal to Sorel	Miles 45	Miles 22-90	Miles	Miles 22-90	Miles All completed
Division No. 2— Sorel to Batiscan	36	12-45		12-45	All completed
Division No. 3— Lake St. Peter.....	20	18-00		* 0-50 †17-50	
Division No. 4— Batiscan to Quebec	59	10-00	0-11	8-53	1-47
Division No. 5— Quebec to The Traverse ..	60	4-65		4-65	
Totals.....	220	68-00	0-11	66-53	1-47

\*Not widened. †Widened



## SESSIONAL PAPER No. 21

## PROGRESS of the Dredging Operations at the date of Writing, the close of the Season of 1920, 30-Foot Project

Locality	Length of Dredging		Cubic Yards yet required to be done
	Required	Done	
	Miles	Miles	
Division No. 1—			
Longueuil Shoal . . .		1.10	
Longue Pte. to Pte. aux Trembles (E.H.) . . .		5.05	
Ile Ste. Therese . . . . .		0.40	
Varennes to Cap St. Michel . . . . .		3.00	
Cap St. Michel to Vercheres . . . . .		4.70	
Vercheres Traverse . . . . .		1.10	
Vercheres to Contrecoeur . . . . .		1.70	
Contrecoeur Channel . . . . .		6.05	
Total . . . . .		22.90	
Division No. 2—			
Sorel to Ile de Grace . . . . .		4.40	
Stone Island . . . . .		1.10	
Ile aux Raisins . . . . .		0.25	
Lake St. Peter (See Div. 3) . . . . .		0.50	
Port St. Francis . . . . .		0.50	
Three Rivers . . . . .		0.50	
Cap Madeleine to Becancour . . . . .		1.55	
Becancour to Champlain . . . . .		2.25	
Champlain to Pte. Citrouille . . . . .		1.30	
Batture Perron . . . . .		0.60	
Total . . . . .		12.45	
Division No. 3—			
Lake St. Peter . . . . .		*0.50	200,000
		†17.50	
Total . . . . .		18.00	200,000
Division No. 4—			
Batiscan to Cap Levrard . . . . .		3.00	
Cap a la Roche Channel . . . . .	0.32	1.73	384,655
Pouillier Rayer . . . . .		1.20	
Cap Charles . . . . .		0.90	
Grondines . . . . .		0.80	
Lotbiniere . . . . .		0.40	
Cap Sante . . . . .		0.20	
Ste. Croix . . . . .	0.60	0.30	300,000
St. Augustin . . . . .	0.60		500,000
Total . . . . .	1.52	9.53	1,184,655
Division No. 5—			
Quebec to the Traverse . . . . .		4.65	550,000
Total . . . . .		4.65	550,000
Totals . . . . .	1.52	66.53	1,934,655

\*Not widened. †Widened.

## PROGRESS of Dredging Operations at date of Writing, the close of the Season of 1920, 35-Foot Project

Locality	Distance English miles	Total length requiring dredging	Length dredged in 1920	Total length of 35 foot channel dredged	Length yet to be dredged
		Miles	Miles	Miles	Miles
Division 1—					
Montreal to Sorel . . . . .	45	28.63		17.11	11.52
Division 2—					
Sorel to Batiscan . . . . .	36	19.75	0.08	6.18	13.57
Division 3—					
Lake St. Peter . . . . .	20	18.32		17.16	1.16
Division 4—					
Batiscan to Quebec . . . . .	59	15.74			15.74
Division 5—					
Quebec to Goose Cape (North Channel) . . . . .	66	8.14		0.75	7.39
Total . . . . .	226	90.38	0.08	41.20	49.18



12 GEORGE V, A. 1922

PROGRESS of the Dredging Operations at the date of Writing, the close of the Season of 1920, 35-Foot Project

Locality	Length of Dredging in Miles		Cubic yards yet to be dredged	Cubic yards dredged
	Yet to be done	Done		
Division 1—				
Longueuil Shoal.....	1.88		549,459	171,995
Longue Pte. Traverse.....	0.39	0.08	443,592	51,550
Longue Pointe Curve.....	1.24	0.08	991,531	242,350
Pointe aux Trembles Channel.....	0.05	3.02	53,625	1,223,475
Ile Ste-Therese Channel.....	1.12		146,611	
Varennas Curve.....	0.45	1.69	593,546	2,297,060
Cap St. Michel Curve..	1.00		500,500	
Cap St. Michel to Vercheres.....	0.25	4.47	177,139	1,913,350
Vercheres Traverse.....	0.25	0.47	92,763	193,625
Vercheres to Contrecoeur.....	1.23	0.68	816,225	554,200
Contrecoeur Channel.....	2.31	5.97	2,038,532	3,574,343
Lanoraie to Sorel.....	0.61		159,215	
Total Division 1.....	10.78	16.46	6,562,738	10,221,948
Division 2—				
Sorel to Ile de Grace.....	0.92	4.06	895,956	2,814,104
Stone Island .....	1.42	0.69	466,370	414,890
Ile aux Raisins.....	0.99	1.10	202,125	777,224
Port St. Francis.....	0.67	0.33	491,303	248,275
Three Rivers ..	0.72		533,192	
Cap Madeleine-Becancour.....	2.40		1,348,578	
Becancour-Champlain..	1.16		932,750	
Champlain-Pointe Citrouille....	4.06		2,632,356	
Batture Ferron.....	1.23		684,600	
Totals Division 2.....	13.57	6.18	8,187,230	4,254,493
Division 3—				
Lake St. Peter.....	1.16	17.16	1,161,570	11,335,582
Totals Division 3.....	1.16	17.16	1,161,570	11,335,582
Division 4—				
Batiscan-Cap Levrard.....	4.48		2,386,168	
Cap Levrard.....	1.27		781,666	
Cap a la Roche Curve.....	2.06		1,836,859	
Cap Charles Channel.....	2.04		1,077,416	
Grondines.....	0.83		513,332	
Lotbiniere.....	0.47		321,480	
Cap Sante.....	1.51		655,561	
St. Croix .....	1.47		798,518	
St. Augustine.....	1.41		826,207	
Totals Division 4—	15.54		9,197,207	
Division 5—				
Quebec to Goose Cape (North Channel).....	2.84		2,585,132	
Madame Reef Shoal (West Sand and East Narrows Shoal).	4.55	0.75	1,024,413	12,543,628
Totals Division 5 .....	7.39	0.75	3,609,545	12,543,628
Totals.....	48.44	40.55	28,718,290	38,355,651



SESSIONAL PAPER No. 21

ABSTRACT of Work of Dredging Fleet during Fiscal Year ended March 31, 1921

Dredge.	Locality of Dredging.	Time of Service Days	Working Hours 10 per day	Hours Actual Dredging	No. of Scows Filled	Cubic Yards Dredged (Scow Mens.)	Depth of Dredging at L.W.	Width in Feet	Character of Soil	Remarks
<i>Laval</i> —No. 1.....	Forsyth Shoal..... Cap a la Roche Curve...	28	280	204	91	22,750	35	400	Hard pan, clay, stones..... Shale, rock, boulders.....	Capt. J. Baron. Widening.
		113	1,130	631½	473	117,950	30	450-550		
		141	1,410	835½	504	140,700				
<i>Lady Minto</i> —No. 4.....	Ste. Anne Curve..... Champlain .....	35	350	225½	151	37,750	35	300	Clay..... Sand, cleaning up. Clay, stones, boulders.....	Capt. Peloquin. Widening.
		58	580	405½	264	66,000	30	450		
		34	340	181½	42	10,500	35	400		
<i>Lafontaine</i> —No. 5.....	Forsyth Shoal..... Cap a la Roche Curve...	127	1,270	812½	457	114,250			Hard pan, clay, stones, boulders, shale rock, boulders.	Widening. Capt. Bibeau.
		35	350	166½	49	11,150	35	400		
		106	1,060	587½	346	79,395	30	450-550		
<i>Beaujeu</i> —No. 8.....	North Channel..... East Narrows..... North Channel W. Sands South Channel, Beaujeu Bank.....	141	1,410	754	395	90,545			Sand, gravel, clay and stones. " " Sand, cleaning up.....	Capt. Bourget.
		80	870	713	189	291,400	35	1,000		
		24	264	217	52	78,500	35	1,000		
		3	36	35½	1	500	30	1,000		
		107	1,170	965½	242	370,400				

Total Cubic Yards dredged, 715,895.



CLASSIFICATION OF DISBURSEMENTS FOR FISCAL YEAR ended March 31, 1921

Vessels	Fuel	Wages	Road	Stores and materials	Repairs and labour	Proportion of general and office expenses	Expenditure for each vessel	Rock cutter and stone lifter service of dredges	Tug service	Inspection and sweeping service	Total cost of operation of each dredge and plant during fiscal year
Elevator Dredge No. 1	\$ cts. 11,113 55	\$ cts. 9,263 09	\$ cts. 2,806 55	\$ cts. 2,235 74	\$ cts. 8,018 67	\$ cts. 15,996 54	\$ cts. 49,414 14	\$ cts. 8,542 89	\$ cts. 23,239 21	\$ cts. 116,818 91	\$ cts. 98,065 15
Tug <i>Varanus</i>	6,165 16	5,950 91	1,735 00	1,914 38	2,624 04	4,849 72	23,239 21				
Elevator Dredge No. 4	9,890 80	8,892 56	2,922 92	2,271 20	11,482 48	16,964 32	52,424 28	8,542 89	23,940 12	16,848 91	101,762 20
Tug <i>James Houston</i>	6,992 87	6,659 89	2,108 10	935 00	2,253 02	4,997 24	23,946 12				
Elevator Dredge No. 5	14,274 20	9,854 30	2,810 80	1,621 42	9,551 66	18,234 03	56,349 41	8,512 88	22,519 47	16,848 91	104,260 67
Tug <i>La St Pierre</i>	6,360 48	5,733 61	2,075 07	1,105 44	2,545 35	4,699 52	22,519 47			16,848 90	142,016 83
Hydraulic Dredge No. 8	42,069 94	20,610 07	4,606 34	2,951 95	20,129 48	34,800 15	125,197 93				
Steamer <i>Detektor</i> , divided equally between the Dredges	27,411 23	14,539 10	5,292 15	1,950 82	4,137 75	14,064 58	67,395 63				
Rock Cutter No. 1 { Divided equally between	3,777 95	5,463 29	1,829 40	1,756 75	1,914 83	3,887 85	18,630 07				
Stone Lifter No. 5 { the Elevator Dredges	1,019 65	2,356 08	835 00	151 65	1,175 70	1,460 51	6,998 59				
	129,075 83	89,352 90	27,021 33	16,897 35	63,832 98	119,954 46	416,134 85	25,628 66	69,704 80	67,395 63	416,134 85



## SESSIONAL PAPER No. 21

## DETAILS of Dredging, Locality and Cost per Cubic Yard

Dredge	Total cost of operations of each dredge and plant during fiscal year	Number of days in operation each dredge	Cost per day operating dredges and plant	Days working each locality	Cost of work each locality	Total cost of operations of each dredge	Number of cubic yards dredged in each locality	Total cubic yard for each dredge	Cost per cubic yard each locality	Average cost per cubic yard for each dredge	Kind of material dredged	Locality of dredging
Elevator Dredge No. 1....	\$ cts. 98,065 15	141	\$ cts. 695 50	28 113	\$ cts. 119,473 93 78,591 22	\$ cts. ..... 98,065 15	22,750 117,950 .....	..... 140,700	85 <sup>69</sup> / <sub>100</sub> 66 <sup>63</sup> / <sub>100</sub> .....	6 <sup>69</sup> / <sub>100</sub>	Clay, stones, hardpan, boulders, shale rock and boulders.	Forsyth Shoal Cap a la Roche
Elevator Dredge No. 4....	101,762 20	127	801 28	35 58 34	28,044 70 46,474 08 27,243 42	.....	37,750 66,000 10,500	.....	74 <sup>27</sup> / <sub>100</sub> 70 <sup>41</sup> / <sub>100</sub> 2-59 <sup>45</sup> / <sub>100</sub>	.....	Clay..... Sand (cleaning up) Clay, hardpan, stones, boulders.	Ste. Anne Curve. Champlain channel Forsyth Shoal.
Elevator Dredge No. 5....	104,260 67	141	739 44	35 106	25,880 31 78,380 36	101,762 20 .....	11,150 793,95	.....	232 <sup>11</sup> / <sub>100</sub> 98 <sup>2</sup> / <sub>100</sub>	85 <sup>10</sup> / <sub>100</sub> .....	Clay, stones, hardpan, boulders, shale rock.	Forsyth Shoal. Cap a la Roche.
Hydraulic Dredge No. 8..	142,046 83	107	1,327 54	80 24 3	106,203 24 31,860 97 3,982 62	104,260 67 .....	291,400 78,500 500	90,545 .....	364 <sup>4</sup> / <sub>100</sub> ..... 7-965 <sup>7</sup> / <sub>100</sub>	1-15 <sup>11</sup> / <sub>100</sub> ..... 38 <sup>34</sup> / <sub>100</sub>	Sand, gravel, clay and stones. Sand, gravel, clay and stones. Sand .....	North channel, East Narrows. North channel, West Sand. South Channel, Beauve Bank.
	446,134 85	516		516	446,134 85	446,134 85	715,895					



12 GEORGE V, A. 1922

## SOREL SHIPYARD

## REPORT OF OFFICER IN CHARGE, LOUIS LACOUTURE

At the beginning of the fiscal year nearly all vessels to be put in commission were outfitted, overhauled, and made ready for the season's operations.

The Richelieu river was clear of ice on April 1, and the St. Lawrence on April 10.

The dredges with their auxiliary vessels were put in operation on ship channel work as follows: Dredge No. 5 on May 3, 1920; Dredge No. 1 on May 5, 1920; Dredge No. 8 on May 9, 1920; Dredge No. 4 on May 24, 1920.

## NEW CONSTRUCTION

No new vessels were constructed at the shipyard during the fiscal year 1920-21.

## BUOY SERVICE

This department was supplied with fittings and materials, such as rods, shackles, chains, hooks, etc., and all repairs were made. Had the use of tug *Varennnes*.

## SIGNAL SERVICE

During the season this department had repairs made to, and supplies obtained for several stations.

## ST. LAWRENCE SHIP CHANNEL

Work was done for this branch in the making and repairing of gauge boards, iron posts, supplying of timber, and also repairs to yacht *Yinkin*.

## PRIVATE FIRMS

Sincennes McNaughton Line.—The tug *Sin-Mac* was hauled out on the ways on May 7, for repairs to hull.

Raymond Concrete Pile Co.—Use of shear legs and tug for putting spud and crane on dredge *Prince Louis*.

A. Beaudet, Sorel.—The steamer *Francois C* was put on the ways for winter to be lengthened and repaired.

Railway and Canal Department.—Propeller wheels of tug *Carillon* were renewed.

Hector Beauchemin, Sorel.—Necessary repairs and caulking to hull of floating house and painting.

Canada Steamships Line.—Welding done to boilers.

Mr. Benson, Sorel.—Repairs to yacht, painting.

## GENERAL

The shipyard ways and wharves and all fences were kept in good repair.

The shipyard launches *Bronx* and *Sorel* were maintained in good order and painted.

The force employed during the fiscal year varied from 518 men in April to 318 in July, 1920, an average of 418 men employed daily.

\*The financial statement shows the total expenditure on the Sorel Shipyard and the St. Lawrence Ship Channel for the fiscal year to have been \$607,625.27.

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\*NOTE.—The statement of expenditure of the Government Shipyard, Sorel, P.Q., does not agree with the statement of expenditure prepared at Headquarters, as the books are not kept in the same way.

The yard credits their appropriations for their claims against other departments immediately on the sending of their accounts to Ottawa for collection. These claims are credited in Ottawa to the appropriation only when they are collected.



## SESSIONAL PAPER No. 21

## EXPENDITURE AND REVENUE

## STATEMENT OF EXPENDITURE AND REVENUE, MARINE DEPARTMENT, 1920-21

Service	Appropriation	Expenditure	Balance	Overdraft
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>Ocean and River Service—</b>				
Dominion steamers .....	1,804,000 00	1,799,420 57	4,579 43	
Examination of masters and mates.....	18,000 00	18,126 50		126 50
Investigation into wrecks.....	12,300 00	4,482 57	7,807 43	
Removal of obstructions.....	5,000 00	482 09	4,517 91	
Registration of shipping.....	10,200 00	1,769 37	8,430 63	
Expenses schools of navigation.....	8,000 00	5,441 51	2,558 49	
Cattle inspection.....	3,000 00	2,649 10	350 90	
Subsidy to wrecking plant.....	35,000 00	35,000 00		
Unforeseen expenses .....	5,000 00	2,826 11	2,173 89	
Life-saving service .....	90,000 00	59,685 30	30,314 70	
Motor patrol in British Columbia.....	65,000 00	69,120 71		4,120 71
Repairing the <i>Aramore</i> .....	75,000 00	76,216 92		1,216 92
Distressed seamen .....	6,500 00	6,384 44	115 56	
	2,137,000 00	2,081,615 19	60,848 94	5,464 13
Less overdraft.....			5,464 13	
			55,384 81	
<b>Public Works—</b>				
Sorel Shipyard.....	65,000 00	100,414 33		35,414 33
Ship channel.....	508,000 00	507,211 94	788 06	
New ice-breaker.....	2,000,000 00	972 35	1,999,027 65	
Shipbuilding programme.....	20,000,000 00	19,994,513 93	5,486 07	
	22,573,000 00	20,603,112 55	2,005,301 78	35,414 33
Less overdraft.....			35,414 33	
			1,969,887 45	
<b>Lighthouse and Coast Service—</b>				
Agencies, rents and contingencies.....	198,000 00	188,474 65	9,525 35	
Salaries .....	650,000 00	644,767 92	5,232 08	
Maintenance and repairs to lighthouses.....	800,000 00	786,388 60	13,611 40	
Construction of lighthouses.....	400,000 00	398,145 91	1,854 09	
Administration pilotage.....	400,000 00	120,039 63	279,960 37	
Repairs to wharves.....	10,000 00	6,791 66	3,208 34	
Pensions to pilots.....	10,200 00	9,000 00	1,200 00	
Telephones <i>re</i> aids to navigation.....	500 00		500 00	
Breaking ice .....	40,000 00	40,000 00		
Allowance, harbour master at Amherstburg.....	600 00	400 00	200 00	
Signal service.....	69,000 00	68,734 84	265 16	
Job Bros., Greenly island.....	375 00	375 00		
	2,578,675 00	2,263,118 21	315,556 79	
<b>Scientific Institutions—</b>				
Meteorological service.....	245,000 00	208,591 53	36,408 47	
<b>Steamboat inspection.....</b>	105,470 00	97,703 64	7,766 36	
<b>Miscellaneous—</b>				
Bonus .....		234,448 19		
Gratuities.....		3,263 96		
Steel purchase.....	500,000 00	189,720 33	310,279 67	
Classification arrears.....		65,997 66		
Retirement Act.....		850 00		
	500,000 00	494,280 14	310,299 67	
<b>Civil Government—</b>				
Civil Government salaries.....	231,810 00	231,810 00		
Contingencies.....	59,000 00	58,670 65	329 35	
	290,810 00	290,480 65	329 35	

## RECAPITULATION OF SERVICES

Ocean and river service.....	2,137,000 00	2,081,615 19	55,384 81
Public works .....	22,573,000 00	20,603,112 55	1,969,887 45
Lighthouse and coast .....	2,578,675 00	2,263,118 21	315,556 79
Scientific institutions .....	245,000 00	208,591 53	36,408 47
Steamboat inspection.....	105,470 00	97,703 64	7,766 36
Civil Government .....	231,810 00	231,810 00	
Contingencies .....	59,000 00	58,670 65	329 35
Steel purchases.....	500,000 00	189,720 33	310,279 67
	28,419,975 00	25,734,342 10	2,695,612 90
Miscellaneous .....		204,559 81	
		26,038,901 91	



12 GEORGE V, A. 1922

REVENUE STATEMENT, FISCAL YEAR ENDING MARCH 31, 1921

	Gross	Refunds	Net
	\$ cts.	\$ cts.	\$ cts.
Harbours	1,019 00	5 00	1,014 00
Piers and wharves	105,796 61	763 78	105,032 83
Dominion steamers	4,075 20	24 50	4,050 70
Civil Service insurance	45 85		45 85
Examination of masters and mates	4,252 05	20 00	4,232 05
Steamboat inspection fund.....	74,016 05	709 57	73,306 48
Decayed pilots fund	7,320 42	39 04	7,281 38
Casual revenue	125,215 64	1,320 23	123,895 41
Fines and forfeitures	540 00		540 00
Signal service	612 00		612 00
Marine registry searches	78 23		78 23
Halifax pilots' pension fund	1,527 42		1,527 42
Halifax pilotage dues	47,447 00		47,447 00
St. John pilots' pension fund	1,662 00		1,662 00
St. John pilotage dues	25,891 87		25,891 87
	399,499 34	2,882 12	396,617 22

METEOROLOGICAL SERVICE

REPORT OF SIR FREDERIC STUPART, DIRECTOR

During the past year meteorological observations have been taken by 634 observers connected with the Government service, and reports from them have been received at the Central office either daily by wire or monthly by mail. Since my last report seventeen stations have ceased reporting, while on the other hand thirty-six have been added to the list.

The following are the new stations:—

Crofton, B.C..	C. F. Walker.
Harper Ranch, B.C..	Mrs. Lott.
Mayne Island, B.C..	H. Lawrence Houlgate.
Port Renfrew, B.C..	L. A. Gritten.
Rotla, B.C..	E. S. Jephson.
Willam Head, B.C..	Ira E. Cornwall.
Pincher Creek, Alta..	Arthur E. Cox.
Stoppington, Alta..	A. C. Stopp.
Three Hills, Alta..	Wm. Burns.
Biggar, Sask..	F. Hopkins.
Kisbey, Sask.	S. G. Soper.
Lanigan, Sask..	Jno. F. Richardson.
Lestock, Sask.	C. L. Russell.
Perigood, Sask.	Geo. B. Harris.
Stanley Mission, Sask..	T. Bear.
Turtleford, Sask..	Sanford Manson.
Yonker, Sask..	C. Roy Christie.
Belleville, Ont..	Waterworks Department
Jacksonboro, Ont..	Geo. R. Lawson.
Longuelac, Ont..	S. A. Taylor.
Muskoka Falls, Ont.	Jas. A. Lawrence.
Sault Ste. Marie, Ont..	J. V. Forster.
Simcoe, Ont..	T. E. Langford.
Waddell's Falls, Ont..	Geo. Blackwell.
Cap de la Madeleine, Que..	S. F. Jennings.
Chandler, Que..	Chas. Samson.
Lake Onatchiway, Que..	H. Mancheron.
Mont Laurier, Que..	Rev. R. Mercure.
St. Tite, Que..	Bros. Louis Gabriel.
Tewkesbury, Que..	Geo. E. Wallis.
Harvey Station, N.B..	E. H. Rand.
Plaster Rock, N.B..	E. R. Irvine.
Woodstock College, N.B..	R. W. Maxwell.
Cape Race, Nfld..	Jno. Kerton.
Lake Harbour (resumed) Baffin Land..	A. L. Learmonth.



## SESSIONAL PAPER No. 21

The weather reporting stations are in two divisions, the first of which includes 352 stations where the observing is performed voluntarily by observers who keep a record of the weather using meteorological instruments supplied by the Government. In the other division are 282 stations where remuneration is allowed proportionate to the duties performed. These latter stations are of various classes, as follows: 15 Chief stations, at which self-recording instruments register the various meteorological elements continuously; 41 Telegraph reporting stations, from which bi-daily reports are telegraphed to the Central office; 70 Climatological stations, where the daily maximum and minimum temperature, precipitation and general weather conditions are recorded throughout the year; 118 rainfall stations, where the precipitation alone is reported; and 37 Western Bulletin stations, where the temperature and rainfall is recorded between April and October. In most instances the Chief stations report by telegraph, and in many instances the rainfall observers voluntarily perform the full functions of a climatological station. In addition to the observing stations there are 110 storm signal stations, the agents at which report the weather conditions during the time the signals are displayed.

The most important and fully equipped stations, outside Toronto, are at Victoria, Montreal, Quebec and St. John, and short reports on these stations are given in appendices A, B, C, D. Winnipeg has also become a very important station and throughout the year a weather map has been published each day exclusive of Sundays and holidays.

## CENTRAL OFFICE

The work at the Central office has been steadily increasing. The establishment of six pilot balloon stations for obtaining data necessary to the aviator and incidentally for the study of the upper air currents has made further assistance imperative. The railways call upon the service with ever-increasing frequency for meteorological data required in the settlement of claims against them; legal firms ask for many certified statements and investigators in the many branches of science connected with agriculture and forest and plant growth solicit the assistance of the Meteorological Service in obtaining data indispensable for the solution of these various problems.

Forecasts have been issued twice daily for all parts of the Dominion and Newfoundland and the percentage of verification has been 84 per cent.

Until last year, with the exception of occasions when storms were expected, no forecasts were issued either on Saturday night or Sunday morning, but now they are issued at these times to the Dominion Wireless stations for transmission to ships both on the Great Lakes and at sea.

The storm-warning service was maintained throughout the year in the Maritime Provinces and during the season of navigation on the Great Lakes and gulf of St. Lawrence. Of the total number of warnings issued 84.4 per cent were verified. In point of frequency November was the stormiest month, but the gale of December 14, of which warning was given well in advance, was the severest of the season on the Great Lakes.

The following stations were inspected from the Central office: Quebec, Father Point, Dalhousie, Bathurst, Caraquet, Shippigan, Chatham, Point Escuminac, Richibucto, Point du Clene, Charlottetown, Summerside, Tignish, Georgetown, Souris, Bonaventure, Paspebiac, St. Godfrey, Port Daniel, l'Anse au Gascons, Newport, The Pas, Qu'Appelle, Moose Jaw, Swift Current, Medicine Hat, Calgary, Edmonton, Kamloops, Vancouver, Winnipeg, Minnedosa, Prince Albert, Battleford, Saskatoon, Banff, Lethbridge, White River, St. John, Digby, Yarmouth, Liverpool, Lunenburg, Halifax, Peggy's Point, Port Hood, Margaree Harbour, Grand Etang, Cheticamp, Petit de Grat, Sydney, Louisburg, Port Morien, Glace Bay, North Sydney, Sydney Mines, Alder Point.



12 GEORGE V, A. 1922

The following Newfoundland stations were inspected; Port Aux Basques, Cape Race, St. John's, Burin and Fogo.

The daily weather map containing the data on which the forecasts are based has been published every day throughout the year; the issue for Sundays and statutory holidays is printed on the day following.

*Publications.*—Four hundred and fifty weather maps have been distributed each day, chiefly to business firms and schools, but many copies are displayed where the public may see them. Each month 645 monthly weather maps and 505 copies of the Monthly Weather Record have been sent out; this latter publication being the official permanent record of the Canadian weather. A small annual issue of 148 copies of the Toronto Meteorological Year Book for 1919 has been distributed, chiefly to observatories.

#### PHYSICS BRANCH

The section was occupied chiefly with the establishment of pilot balloon stations at the aerodromes of the Air Board. The equipment and balloons were furnished by the Meteorological Service and the staff at the aerodromes did the work. The single theodolite method for following the balloons was adopted. This method assumes that a balloon will rise at a constant rate depending on the weight of the balloon and the free lift, "The weight that the balloon will just lift." The results of many series of observations have shown that after the first five or six minutes the rate is very constant as the gradual loss of hydrogen just balances the increased velocity due to diminished air pressure. The rate of ascent adopted for the balloons was 160 metres per minute (525 feet per minute) and this requires a free lift of from 80 to 100 grammes.

Stations were opened at Vancouver, B.C.; Morley, Alta.; Camp Borden, Toronto, Ottawa, Ont.; and Roberval, Que. Toronto and Camp Borden were opened in June, Vancouver and Morley about the end of August, and Ottawa and Roberval in October. All the stations were closed during the winter and the one at Morley has been moved to High River, Alta.

Balloons were despatched from these stations daily unless the day was foggy or the clouds very low. The ascents were made in the morning and at Toronto the results were obtained in time to be used in the forecasts. The highest flight obtained at Toronto was on September 4; the balloon was followed for ninety-four minutes and reached a height of nearly 50,000 feet, when it burst.

Instruments and equipment for pilot balloon and magnetic observations have been made in the office for a station at Fort Good Hope to be operated for a year or more in connection with the International work of the Amunsden expedition.

It was impossible to get the large balloons for carrying instruments until January of this year and some flights were made from Kingston, but only about 25 per cent of the balloons were recovered and the attempt had to be abandoned; the ascents will take place from Woodstock as before. The department desires to take this opportunity of thanking Professor Clark, Ph.D., of Queen's University, for superintending the ascents at Kingston.

The apparatus for atmospheric electricity has been redesigned and partly reconstructed but there was not time with the other work that had to be done to test it out.

A satisfactory design of resistance thermometers for taking the temperature of ocean water on board ship has been worked out and it is hoped to equip some of the Pacific ships with them this year. Considerable progress has been made with the installation of thermometers for earth temperatures.



## SESSIONAL PAPER No. 21

## CLIMATOLOGY AND AGRICULTURAL METEOROLOGY

In the *Monthly Record* have been compiled and published hourly or bi-hourly records from the principal stations, daily records from fifty-two telegraph stations, and monthly means and extremes for some five hundred stations of the second class, for about eighty-five precipitation stations, and about sixty sunshine stations.

Preparing statements of the weather for legal claims in actions-at-law or for similar purposes has become a great burden to this division. Commencing with the January number for 1921, to obviate the necessity for so much copying, we are publishing in the *Monthly Record* the daily maximum and minimum temperatures and daily rainfall or snowfall for some two hundred stations in addition to the fifty telegraph stations. This arrangement will allow public carriers and their customers to gather in future from the pages of the *Monthly Record* practically all the data needed to settle disputes involving the weather.

A report of the climate of the western provinces, with sixteen large meteorological maps, has been issued. A report on the climate of Ontario is in preparation.

Special articles for other departments or for provincial governments, tables, maps and diagrams have been prepared during the year.

Research is continuing into the effect of weather-changes on crops, as to yield and quality. Better arrangements have been made for gathering observational material and for its analysis. Mr. Connor attended a Meteorological Conference in Washington and made preliminary arrangements for an interchange of certain data on crop growth which will be of great assistance to this division.

A study of tree sections in relation to contemporaneous weather changes has been begun and it is hoped that later we may be able to carry back the meteorological history of the dry regions of the west beyond the earliest observations in the early eighties, and so to gain a better idea of the probable incidence and severity of droughts in various districts of the wheat regions. Mr. McDougall's previous training and experience in forestry will be of great value in this particular field.

## MAGNETIC OBSERVATIONS

During the fiscal year 1920-21, continuous photographic records of the magnetic elements at Agincourt were secured without material loss. Magnetic disturbances were less frequent than for several years being synchronous with decreasing sun-spots and auroras. The more pronounced disturbances occurred on the following dates: 1920-April 15, September 28, 29. During the latter of these the recording limits of the instruments were exceeded for short intervals.

Absolute observations made weekly kept good control of the value of the base line of the differential instruments.

Tables showing the magnetic character of each day were prepared and copies forwarded to the International Commission on Terrestrial Magnetism. The "selected days" of the commission are used in the analysis of the magnetic data for the Annual Magnetic Report. The 1919 report is now in course of preparation.

At the request of the Surveyor General index corrections for compasses attached to sixty-five surveyor's theodolites were determined and the results forwarded to him. Assistance was also given to several members of his staff in determining the constants of their total force instruments both before and after their summer field work.

Mr. French and Major Pearce, of the Dominion Observatory staff, were also assisted in standardizing their magnetometers both before and after their field work.

At Meenook the photographic records of declination were obtained with only slight loss. During the very cold weather difficulty was again experienced in maintaining continuous operation of the clocks. This would to a great extent be overcome if the differential apparatus were placed underground as at Agincourt.



12 GEORGE V, A. 1922

The weekly observations of declination and inclination were continued throughout the year and twice monthly observations of horizontal force.

The Meanook traces were loaned to the Surveyor General, and the Agincourt traces to the Dominion Observatory for use in the reduction of their field work.

The accompanying tables give a summary of the results obtained at Agincourt and Meanook during the fiscal year 1920-21:—

SUMMARY of Results of Magnetic Observations made at Meanook during the Fiscal Year 1920-21

Month	Mean Monthly Values			
	D East	H	Z	I
	° ' "	✓	✓	° ' "
1920				
April	27 38.0	12,908	60,228	77 54.2
May	39.0	08	142	53.2
June	38.0	40	266	52.9
July	38.3	15	141	52.8
August	38.1	11	182	53.5
September	38.7	20	258	53.9
October....	38.7	26	260	53.6
November	37.7	26	277	53.8
December.	37.0	28	218	53.0
1921				
January	37.0	34	246	53.0
February.....	36.5	20	198	53.2
March.....	36.2	16	197	53.4

MEANOOK DAILY AND MONTHLY RANGES OF D

Month	From hourly readings	From Max. and Min.	Absolute Monthly range
1920			° ' "
April.....	17.8	50.9	3 49.9
May	16.2	44.1	2 58.3
June	17.1	28.8	1 56.5
July.....	17.3	30.6	2 19.3
August	17.6	38.9	1 52.6
September	12.6	60.0	2 57.4
October.....	11.3	43.0	3 12.3
November	8.8	30.5	2 05.0
December	10.4	32.4	4 17.1
1921			
January	8.8	23.1	0 57.6
February.	6.6	22.3	1 35.4
March	9.1	34.4	2 07.8

SUMMARY of Results of Magnetic Observations made at Agincourt during the Fiscal Year 1920-21

Month	Mean Monthly Values			
	D. West	H	Z	I
	° ' "	✓	✓	° ' "
1920				
April	6 44.5	15,864	58,202	74 45.2
May	44.7	76	179	44.2
June	44.1	77	164	43.9
July	45.1	72	146	43.9
August	46.3	67	139	44.1
September	46.9	49	129	44.9
October	47.1	46	122	45.0
November.....	47.2	51	115	44.6
December	47.5	56	122	44.5
1921				
January	48.2	55	110	44.3
February	48.2	57	107	44.2
March	49.0	53	099	44.3



SESSIONAL PAPER No. 21

AGINCOURT DAILY AND MONTHLY RANGES

Month	D			H			Z		
	Mean Daily Range		Absolute Monthly Range	Mean Daily Range		Absolute Monthly Range	Mean Daily Range		Absolute Monthly Range
	From hourly readings	From Max. and Min.		From hourly readings	From Max. and Min.		From hourly readings	From Max. and Min.	
1920									
April.....	11.9	24.9	1 11.1	50	106	455	25	67	413
May.....	12.9	20.4	0 46.3	49	94	385	18	50	245
June.....	13.5	19.0	0 36.3	43	70	253	14	33	173
July.....	14.2	20.6	0 54.2	46	77	210	16	36	205
August.....	13.9	23.1	1 17.8	48	82	424	17	52	375
September.....	11.9	28.1	1 57.0	58	146	826	7	100	572
October.....	9.2	20.8	1 14.2	42	80	419	15	34	229
November.....	8.7	16.0	0 50.7	29	55	140	12	29	269
December.....	6.5	15.9	1 11.2	28	56	190	10	22	187
1921									
January.....	6.6	13.4	0 37.9	26	44	108	4	11	42
February.....	6.7	12.9	0 34.3	25	45	162	4	12	46
March.....	10.4	19.3	0 47.2	36	63	200	10	24	125

TIME SERVICE

During the year ending March 31, 1921, seventy-two determinations for time have been made with the Houghton and Simms transit instrument of 3-inch aperture.

The positions of the stars have mostly been taken from the American Ephemeris and British Nautical Almanac.

The usual observations have been taken frequently to determine the instrumental errors of the transit instrument in azimuth, level and collimation.

Inquiries for time, both mean and sidereal, have been numerous, and rating of chronometers and watches, both sidereal and mean time, has been carried on throughout the year.

The sidereal and mean time clocks have given great satisfaction. These clocks have been in use since the establishment of the Observatory and are still in good order and performing well.

The usual 11.55 a.m. signal on the fire-alarm system has been continued throughout the year.

Time has been given weekly to the Magnetic Observatory at Agincourt.

Visitors and others have been very numerous and accorded privileges of viewing the heavenly bodies whenever opportunities offered with the 6-inch telescope.

The time exchanges between Toronto and Quebec, Montreal and St. John, N.B., have been made as usual, being recorded on the chronographs at Toronto, Montreal and St. John.

The errors of the clocks have been computed from the latest observations.



12 GEORGE V, A. 1922

The following table will show the differences between the times of the several observatories and that at Toronto. The sign indicates slow of Toronto.

Date	Montreal	Quebec	St. John
1920	seconds	seconds	seconds
April 9.....	0.63	wire trouble	0.75
April 23.....	0.57	1.31	0.80
May 7.....	0.27	0.19	0.13
May 21.....	0.31	0.53	0.79
June 11.....	0.29	0.42	0.68
July 9.....	0.09	0.74	No exchange
July 30.....	0.37	1.02	trouble on loop
September 10.....	wire open	0.22	0.12
October 8.....	1.12	0.10	0.71
November 5.....	0.12	0.05	0.71
December 10.....	1.10	0.21	0.28
December 31.....	0.72	0.45	0.25
1921			
January 21.....	0.02	0.56	1.29
February 4.....	0.27	1.51	0.01
February 23.....	0.26	0.48	0.33
March 11.....	0.81	0.82	0.90

SOLAR OBSERVATIONS (CIVIL YEAR 1920)

The sun was observed on 165 days and on four of these, namely, April 8, 23, and September 17, 18, it was free of spots. The usual maps were made with the 6-inch equatorial refracting telescope showing the position of the sun's axis and equator, together with the N., S., E. and W. points.

The relative number of sunspots (computed from Wolf's formula,  $r = 10g + f$  where  $g$  is the number of groups visible on any day, and  $f$  the total number of spots, whether they were in the groups or isolated) for the months of the civil year ending December 31, 1920, were: January, 59.7; February, 56.9; March, 86.6; April, 17.8; May, 41.8; June, 54.1; July, 33.7; August, 18.8; September, 44.4; October, 63.3; November, 35.7; December, 38.8. Yearly mean being 46.0, that for 1919 being 74.6, showing a decrease of 28.6.

The largest spot group during the year was first observed on March 15, its northern edge just grazing the equator. It was composed of numerous moderately sized penumbrae spots with many smaller ones together with very small spots, forming a very beautiful and spectacular group stretching parallel and close to the equator for a fourth of the sun's visible disk, and disappearing over the western limb March 28. Its greatest relative spot number was on the 22nd, being 172.

SEISMOLOGICAL OBSERVATIONS

The seismographs at Toronto and Victoria have continued in operation with little loss of record throughout the fiscal year. One hundred and thirty-eight disturbances were recorded in Toronto, the greater number being of small amplitude. This is 47 greater than the normal number and is in striking contrast to the small yearly number recorded from 1900 to 1913. The largest monthly total, 19, occurred in March, and the least, 7, in November. The principal movements were on September 20 and December 16, the latter being one of the largest ever recorded here, possibly next to the San Francisco quake of April 18, 1906. The seat of the disturbance was in China, the provinces of Shensi, Kansu and Szechwan being particularly affected. Damage to life and property was appalling, whole families were completely wiped out, hills came down into ravines and thousands of people as well as their animals were completely buried alive. Streets opened up, causing the houses on both sides to fall together. These are only a few of the terrible list of casualties.



## SESSIONAL PAPER No. 21

We continue to forward abstracts of our observations to various seismological centres throughout the world and receive a large number of bulletins in return. We also furnish the Associated Press by request with information regarding the distance, character, etc., of any large earthquake.

Investigation regarding the correlation of microseisms and meteorological phenomena has been regularly carried out as well as the plotting of large earthquakes.

The new Milne Shaw instruments referred to in our last report have not yet arrived.

## PHENOLOGICAL OBSERVATIONS

Records of dates of the flowering of plants, leafing of trees, ploughing, sowing, reaping, etc., which, to be of value, require considerable care and attention, are undertaken wholly by voluntary observers. These records are not only valuable from a climatological and agricultural point of view, but are of use to botanists, ornithologists and others. The summary of observations kindly supplied by Dr. A. H. Mackay, Superintendent of Education for Nova Scotia, which covers the whole of that province, is excellent as usual. Reports from other portions of the Dominion showed a somewhat diminished interest, excepting in the province of Saskatchewan, where, under the direction of Mr. W. H. Magee, Inspector of Schools, the number of reports was increased. The collection and preparation for publication of these reports is in charge of Mr. F. F. Payne, of the Central office.

## APPENDIX "A"

The Director of the Quebec Observatory reports as follows:—

During the year under review, numerous inquiries have been received concerning weather conditions, and in many instances, from members of the legal profession, in cases where such information was required.

Apart from the Official Weather Bulletin, which is communicated daily to the public, this office has answered a considerable number of inquiries from residents of this city, tourists, and from farmers during the harvesting season, concerning the local weather forecasts.

The correct time was given regularly by means of the noon-gun and the time-ball, and also by telephone.

The various instruments at this station have been verified during the year by one of the inspectors of the department, and are kept in good working order.

The time-ball was dropped for the last time on the 20th of December last, when the last steamers left the harbour at the close of navigation season. It will be dropped for the first time, this year, on the 1st of April, the river being now clear of ice from Montreal to the gulf of St. Lawrence.

## APPENDIX "B"

The Director of the St. John, N.B., Observatory reports as follows:—

## METEOROLOGICAL SERVICE

No changes have been made in the meteorological equipment nor in the exposure of the instruments. All apparatus, including the electrical and autographic recorders, have been maintained in good working condition.

The records of this observatory from the autographic and electrical registering instruments show the state of the atmosphere, during every instant of the day and night. The factors thus continuously noted are the pressure of the atmosphere, temperature, humidity, sunshine, rainfall, wind direction and velocity. Hourly abstracts



12 GEORGE V, A. 1922

have been made and daily and monthly means computed. These records have been supplemented by the chief station tri-daily eye readings of the instruments and observations of the various meteorological elements made at equal intervals of six hours, commencing at 9 a.m. Atlantic standard time. Results of the morning and night observations are immediately telegraphed to the Central office, Toronto, for use of the weather chart. An extra observation is taken on week days at noon to accompany a daily report furnished the afternoon papers. The eye readings of the standard instruments serve the purpose of checking the automatic recorders. Readings of the solar and terrestrial radiation thermometers have been made daily.

Wind records of direction and velocity registered by the anemograph at Point Lepreaux station, sent here weekly, have been tabulated for every hour and a monthly analysis abstracted. This station with its free exposure to the bay of Fundy continues to give most useful information of the wind direction and its velocity.

The wind vanes and anemometers at Point Lepreaux and St. John are frequently changed, cleaned and lubricated to ensure good results, duplicate instruments being kept in condition to make these changes when necessary.

The number of requests for information from the official records has largely increased and considerable time is consumed in answering these inquiries from engineers, contractors, shippers, transportation companies and other.

Innumerable telephone calls have been received daily, and frequently at night, for the forecasts, prevailing conditions, and other information concerning the weather. In addition to our daily local report the press continue to make free use of information, particularly during stormy or unsettled weather conditions. On occasions special messages have been telegraphed to pilots of air craft passing this way.

#### WEATHER BULLETIN

The morning weather bulletin from Central office received by telegraph has been printed on the duplicating machine and promptly issued. Some curtailment of the issue was caused by the cancelling of its free distribution by the postal authorities. Several firms agreed to pay the necessary postage rather than do without the valuable information contained therein.

The monthly reports received from all the observers in the Maritime Provinces have been checked and in most cases sums and mean values extracted. After extracting the necessary data for our registers, these returns were forwarded to your Central office. The necessary annual supplies for Maritime Province stations have been packed and shipped. Under your direction temperature and rainfall observing stations have been opened and others requiring inspection visited.

#### TIME SERVICE

For determination of clock errors and rates, star observations have been made on available nights with the 3-inch Troughton & Simms meridian telescope. The transit micrometer method of observing has been used entirely throughout the year, reversing the telescope on each star to take care of collimation and pivot error, nine contacts being made in each position of the axis and the records from these contacts recorded on the chronograph along with the seconds from the observing clock as formerly reported. Comparisons of the Sidereal and mean time transmitting clocks have been made on the chronograph and any small error of the transmitting clock corrected by the electrical apparatus formerly described.

The Riefler sidereal clock, mounted in the equal temperature vault in the basement, where it has been running under constant pressure and temperature conditions, has continued to give most satisfactory and reliable results. The Kulberg sidereal and mean time transmitting clock have been cleaned and adjusted. The daily time



## SESSIONAL PAPER No. 21

signals which reach nearly all important points in the Maritime Provinces have been regularly transmitted direct from the mean time clock every week day at ten o'clock.

The time-balls at St. John and Halifax under control of the time service of this observatory have been dropped each week day throughout the year at 1 p.m. Atlantic standard time. In some parts of the Maritime Provinces the so-called daylight saving time was in operation for a portion of the year, while in other parts standard time was in use, thus causing considerable confusion.

The master clock in Halifax, which is daily synchronized by wire from our standard mean time clock, continues to give satisfactory service for automatically dropping the time-ball, firing the gun and hourly synchronizing clocks electrically connected with it in Halifax.

In St. John this extensive system of hourly correcting office, tower and street clocks has given most useful results; little or no trouble has been experienced and the service from several years' operation has proved highly satisfactory.

Owing to additional clocks and time-dating stamps in their offices here the Western Union have run a special loop to connect with our master clock. Previous to this they made use of the loop which carries the regular time signals, but as this only gave them synchronizing service for portions of the day and night they decided a continuous service would be more satisfactory.

## APPENDIX "C"

The Director of the Gonzales Heights Observatory, Victoria, B.C., reports as follows:—

During the past year the regular meteorological observations have been taken and daily weather forecasts issued for the following districts: Vancouver Island, the Lower Mainland, Kamloops, and Kootenay. During the spring and early summer special frosts warning forecasts were issued daily to the following fruit-growing centres: Vernon, Kelowna, and Penticton in the Okanagan, and also to Nelson and Creston in Kootenay. In the autumn forecasts were issued to the same districts respecting the advent of killing frosts for the benefit of vegetable growers, and later warnings of severe frosts were issued as an aid to the fruit pickers, and finally temperatures were furnished daily from British Columbia to Manitoba to the large fruit shippers in order that they might know what temperatures would be encountered in shipping eastward, and also forecasts a day in advance were issued for their benefit.

Storm warnings have been issued for the ports of Victoria, Vancouver, and Nanaimo with beneficial results, especially by owners of small craft, and during the stormy months almost daily 'phone and telegraph inquiries have been received from fishing and towing interests respecting weather conditions.

During the summer months the Provincial Forestry Department has been advised of coming hot spells and probable wind forces and directions to be encountered.

The time service has been very satisfactory throughout the year and the clocks and chronometers have retained remarkably steady rates throughout, largely due to the even temperature the time room is kept at for all seasons. The time-ball has been dropped daily in the city from here by wire with only one or two wire interruptions. Time is also sent out from here daily by wireless at 10 a.m. to all shipping and wireless stations within a radius of 300 miles. This is proving of great benefit to mariners desirous of rating their chronometers before leaving port. As the city of Victoria has for some time been desirous of obtaining a reliable gun fire time signal at 9 p.m., I am pleased to state that General Ross, Commanding Officer here, has installed a regular gun for this purpose at the barracks, and to ensure accurate time for firing this I have arranged with the commanding officer to receive the time each night by 'phone from this office; that is, the officer on duty calls this office at two minutes to



12 GEORGE V, A. 1922

the time of firing, and receives the order to direct fire from our corrected chronometer through the special 'phone placed in the time room. The time error in firing is checked here by the gun concussion in the 'phone, which very seldom exceeds one second. We also fire the same gun at noon in the same manner, but this is not heard so generally as the night one, which is greatly appreciated by the citizens.

During the past year I have addressed a number of school classes and public meetings upon educational lines pertaining to our service, and am pleased to state that this institution is becoming so favourably known that during the past twelve months nearly three thousand visitors have been shown over it, and these appear to have greatly appreciated the personal attention and information given them.

During the past year 131 earthquakes were recorded here on the seismographs, and the greatest monthly number was 18 in March. Owing to the specially constructed "cushioned" cement floors in the basement all visitors were allowed to pass through the seismograph rooms and have all the working parts of these instruments explained to them without interfering with the records.

In conclusion I would suggest that in order to increase the efficiency of our storm warning service during the stormy months of winter that arrangements be made with the owners of the transpacific liners that leave from and return to the strait of Juan de Fuca that they send wireless barometer and weather readings at 5 a.m. and 5 p.m. 120th meridian standard time to our wireless stations when within sending distance of those on the coast, in order that these reports may quickly be forwarded to our Gonzales wireless station, then 'phoned to this office, where they will materially aid in determining the position of the great Pacific storms hours in advance of our coast reporting stations now relied on.

I would again respectfully urge that the seismographs which have been ordered from England some time ago for here be forwarded as soon as possible, for being the most efficient in the world, the records from them when installed here will be greatly appreciated locally, and by seismologists abroad who by access to our records will be able to determine the place of origin of these quakes more accurately than in the past.

#### APPENDIX "D"

The Director of the McGill University Observatory reports as follows:—

The year's work of this station has been uninterrupted and has been, as in former years, the carrying on of the weather and time service. The demands made by the city for information have not lessened and we are continually at a disadvantage in striving to answer inquiries of all sorts which are usually legitimate. Our facilities, equipment and staff are inadequate to fulfil that concept in the public mind of a properly supplied meteorological or astronomical observatory. For a city of the importance of Montreal these services should be on a more adequate scale.

We cannot but continue to insist that both the university and the Government should have in mind the necessity of an observatory in Montreal, better located, better equipped and a greater service to the public and the university than the present McGill College Observatory.

The meteorological work done is that prescribed by the Meteorological Service, which directly concerns the public at large. Apart from visiting students, and the certain facilities provided some few of them by the meteorological equipment, the university has little interest in or advantage from the meteorological work. There are no meteorological courses provided for in the curriculum. On the other hand, the public addresses itself to the university as much as to the Meteorological Service for such information as we are always ready to impart. As an astronomical observatory, apart from the time service and the facilities for aiding the small classes in practical astronomy thereby provided, we have no equipment or pretensions.



## SESSIONAL PAPER No. 21

The site is entirely unsuitable for astronomical observations and to some extent for meteorological work.

The co-operation of the Government and university in providing a new observatory on another site, largely given to meteorological work, and with astronomical equipment that might serve for instructional purposes, if no more, might be expected. McGill University, dependent on the public for financial support, might, we think, accept this means of better serving its interests and those of its supporters. And the Government duty is to provide a better meteorological station for Montreal than the present.

In view of our hesitation in asking for extensive alterations and additions to an antiquated institution on an unsuitable site no complaints are made of immediate condition of the equipment.

For the support of the staff, however, the funds are continually deficient.

Our estimates for the staff as at present are: Superintendent, \$1,000 annually; time clerk, \$600 annually; weather clerk, \$600 annually; office girl, \$340 annually.

The superintendent, for personal reasons, has found it wise to aid the time clerk to relieve himself of a routine chore that demanded the surrender of all liberty. The necessity of having this assistance was always admitted, but whether the estimate will be approved is as yet uncertain.

The question of residence does not enter, as the superintendent engineer of the university now has the privileges of the residence, and the writer rents his quarters in the building from the university.

Having in mind the purpose for which the residence formerly stood, the writer applied for it, offering a reasonable rental, but no action being taken on his proposal for three months, he withdrew it and dismissed the subject.

It may be said that while there exists in name an observatory department in the university, there exists no defined policy with its regard.

The financial resources on which the observatory depends are those grants and supplies from the Meteorological Service, grants and supplies from the university, cash grants from the city, the Harbour Commissioners and the subscribers for the time signals, from the Canadian Pacific and Grand Trunk Railways, and some half dozen jewellers.

The revenues and expenditures are handled through the bursar's office entirely. Financial statements to be forwarded will be requested and forwarded as soon as available.

No new apparatus was added in the year. An old Friez thermograph was replaced with a new one from the Meteorological Service and all minor supplies requested were promptly provided.

The four astronomical clocks, two sidereal and two mean time, were kept regulated and have performed satisfactorily.

The results of seventeen time exchanges with Toronto were separately submitted a few days past. We have supplied the railways and city with time signals with no complaints. We must, however, again draw attention to the harbour time-ball. We have attended to the switch every week-day noon without fail. Frequently the ball is not up, or there is no current in the loop, and we learn that the attendant at the harbour does not regularly raise the ball except in the navigation season. We have had to write the secretary of the H.C.M. accepting as our responsibility only the throwing of the switch. We, however, continually report to the harbour office or the wire chief the lack of current on the loop. The time-ball is so exposed as to be quite invisible to a large part of the shipping.

In the course of the present month, the re-erection of several poles and repairs to the cable here from the Mount Royal tower, where the anemometer is exposed, were attended to at our request by the college labourers. The account of this we have asked for, and expect to have it rendered to the Meteorological Service.



12 GEORGE V, A. 1922

The calendar recorder of difference of temperature between the mountain and campus is being kept in operation. We find the records not amenable to analysis and have failed to draw any systematic conclusions from them. The erratic results confirm our belief that the compensation is not perfect, nor the exposure on the hill suitable.

We do not allow the local adoption of daylight saving time to affect our taking of records. It causes inconveniences with the staff in the taking of observations and sending of time signals however.

That discussion and conference between the head of the Meteorological Service and the principal and governors of the university regarding the future of the observatory would lead to a clearer definition of policy we respectfully submit.

REPORT OF L. A. DEMERS, WRECK COMMISSIONER

Formal investigations during the year.....	29
Preliminary inquiries during the year.....	11

During the calendar year 1920 there were 227 casualties reported to the department, the tonnage of same being 222,928 net, and the stated damage \$1,643,825, while 28 lives were lost.

Of this total number of casualties 188 were to coasting and sea-going vessels, the tonnage of same being 195,856 net, and the stated damage \$1,368,625, while 28 lives were lost. The remaining 39 casualties were to inland vessels, the tonnage of same being 27,075 net, the stated damage being \$275,200.

In 137 casualties to coasting and sea-going vessels, and 26 casualties to inland vessels, the amount of damage is not stated; 55 of the casualties to coasting and sea-going vessels made up of 24 steam and 31 sailing vessels, resulted in total losses, and of this number 51 were Canadian, 1 British and 3 foreign vessels.

Ten of the casualties to inland vessels resulted in total losses, of which 8 were steam and 2 sailing vessels, 9 being Canadian and 1 foreign.

The casualties are given under the following headings:—

COASTING AND SEA-GOING VESSELS

Collisions.. . . .	41
Foundering.. . . .	18
Missing vessels.. . . .	1
Miscellaneous accidents, fire, loss of sails, etc.. . . . .	53
Strandings.. . . .	75

INLAND VESSELS

Collisions.. . . .	6
Foundering.. . . .	3
Miscellaneous accidents.. . . .	7
Strandings.. . . .	23



## SESSIONAL PAPER No. 21

## STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and foreign vessels, held during the fiscal year 1920-21

Name of ship and official number	Registered port	Remarks
Atikokan..... 131053	Port Arthur.....	On May 12 was stranded on Madam island, river St. Lawrence. Preliminary inquiry was held at Quebec, on May 00, 1920, by Commander H. St. G. Lindsay, R.D., R.N.R. Formal unnecessary.
Aspy..... 122585	Yarmouth, N.S.	Charges were made that on August 13, Captain Urias York abandoned tug <i>Maggie M</i> and schooner in tow in position of extreme peril. Charges preferred by H. C. Corson of South Ingonish. Formal investigation was held at Sydney, N.S., by Commander H. St. G. Lindsay, R.D., R.N.R., on 16th of October, 1920. <i>Finding:</i> The evidence adduced did not bear out the charges preferred against Captain York.
B. X..... 126516	Victoria, B.C.....	In September, 1919, stranded between Quesnel and Fort George, B.C., Preliminary inquiry held at Vancouver by Captain Charles Eddie on March 28, 1921. Formal recommended; but owing to difficulty in securing evidence, has not been held.
Canadian Voyageur..... 140957	Montreal.....	On April 17, collided in bay of Fundy, resulting in sinking of <i>Howard D. Troop</i> . Formal investigation was held on April 22 and 23, 1920, before Captain J. B. Henry, assisted by Captain A. J. Mulcahy and Captain S. Orr, acting as assessors, at St. John, N.B. <i>Finding:</i> Both ships were held to blame. Masters cautioned.
Howard D. Troop..... 103264	St. John.....	
Clare Hugo Stinnes 1 143084	London	On September 30 stranded on shoals off Amet island, N.S. Formal investigation was held at Pictou, N.S., on October 14, 1920, by Commander H. St. G. Lindsay, R.D., R.N.R., assisted by Captain W. A. Beattie and Captain D. C. Fraser, as Nautical Assessors. <i>Finding:</i> Master R. H. Nesbitt, showed lack of judgment in not stopping his vessel and making sure of his position. He is severely censured.
Chama..... 120508	London	On October 21, stranded on Bellechasse islets, river St. Lawrence. Formal investigation was held on November 3, 1920, at Montreal, by Captain L. A. Demers, F.R.S.A., assisted by Captain C. J. Stuart and Captain J. B. Henry, as Nautical Assessors. <i>Finding:</i> Second officer, Wm. Thos. Lane, was severely reprimanded for lack of realization of his responsibilities. Pilot Arthur Paquet's license suspended for six months, and is ordered to defray costs of investigation for having given a wrong order to port helm which he did not correct.
City of Colombo..... 128009	Liverpool.....	On March 20 stranded and lost sixteen miles west of Digby, Nova Scotia. Formal investigation was held at St. John, N.B., on March 28 and 29, 1921, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain A. J. Mulcahy and Captain John Hall, as nautical assessors. <i>Finding:</i> Master J. J. Robertson found solely in default for failing to watch or instruct his officers to observe compasses; shaping a definite course on a departure obtained by a single sound of Pt. Lepreau fog-horn; to take into serious consideration unknown and unchecked error of log; in ignoring the existence of Direction Finding Station at Red head. Master's Board of Trade Certificate No. 006295 suspended for three months.
City of Vancouver..... 150255	Vancouver.....	On February 2 collided at Esquimalt, B.C. A preliminary inquiry was held on March 24 at Esquimalt by Captain John D. Macpherson, Wreck Commissioner for British Columbia. Formal unnecessary.
Armentieres.....		
Dunaff Head..... 136370	Belfast.....	On November 10, collided off Father Point, Que. Preliminary inquiry was held on November 24, 1920, at Montreal, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner. <i>Finding:</i> Accident was inevitable under the circumstances. Formal unnecessary.
Eureka..... 93940	Quebec.....	
Dredging Plant and tow of tug.....		On February 17 the dredging plant in Victoria harbour was fouled by boom of logs in tow of tug <i>Olive M</i> . Preliminary inquiry was held on March 16, 1921, at Victoria, B.C., by Captain John D. Macpherson, Wreck Commissioner for British Columbia. Formal unnecessary. Accident unavoidable.
Olive M.....		
Georgie..... 146858	(French).....	On October 21 stranded at Sillery, Quebec harbour. Formal investigation was held on October 28, 1920, at Montreal by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain C. Lapierre and Captain J. B. Henry, as nautical assessors. <i>Finding:</i> Pilot J. B. Angers solely to blame for accident and found in default for hazardous navigation. He was ordered to defray costs of investigation and suspended for balance of season.
Harmonie..... 122553	Collingwood.....	On July 7, stranded five miles above Harbour Beach, Ontario. Formal investigation was held on July 21, 1920, at Sarnia, Ontario, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain C. E. Millard and Captain W. A. Glass, as nautical assessors. <i>Finding:</i> Accident due to omission to exercise necessary caution. Master O. M. Wing suspended for two months. Second officer cautioned. Master's certificate No. 6939.
Henry B. Hall..... 138094	Montreal.....	On September 21, collided near Sorel, P.Q. Formal investigation was held October 14 and 15, 1920, at Montreal, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain J. B. Henry and Captain Chas. Lapierre, as nautical assessors. <i>Finding:</i> Captain F. X. Lachance, of SS. <i>Montreal</i> , in default for contravention of rule 22, and is severely reprimanded. Pilot Oscar Perron of <i>H. B. Hall</i> was exonerated from blame.
Montreal..... 116600	Montreal.....	



12 GEORGE V, A. 1922

STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and foreign vessels, held during the fiscal year 1920-21—*Continued*

Name of ship and official number	Registered port	Remarks
J. A. McKee..... 125442	Sault Ste. Marie....	On August 26 stranded on Lark Reef, St. Lawrence river. Formal investigation was held September 13, 1920, at Montreal, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain C. J. Stuart and Captain Chas. Lapierre, as nautical assessors. <i>Finding:</i> Master James Lintlop failed to exercise the judgment his responsibility demanded. His certificate, No. 3761, suspended for two months. Pilot Edmond Baquet's license suspended for remainder of season of 1920.
Kaduna..... 128029	Liverpool.....	On February 23 struck ledge off Fourchu, C.B. Preliminary inquiry was held at Louisburg on February 28, 1921, by Captain James Sutherland. Formal investigation was held on March 15, 1921, at Halifax, by Commander H. St. G. Lindsay, R.D., R.N.R., assisted by Captain C. L. Willett and Captain Neil Hall, as assessors. <i>Finding:</i> Vessel carried inshore by ice pressure to starboard, which, owing to weather conditions and darkness, was not perceivable by those in charge. The court was of opinion that had master been aware of non-existence of light on Fourchu Head the casualty would not have occurred. Master cautioned.
Merry Sea..... 130452	Vancouver.....	On March 29, 1920, damaged by fire in Burrard Inlet, B.C. Preliminary inquiry was held by Captain John D. Macpherson, on April 13, 1920, at Vancouver. Fire caused by the upsetting of a coal oil stove in the wheelhouse attributed to negligence and thoughtlessness of her master, Alfred Oliver Copp. Formal not necessary.
Manchester Division..... 135369	Manchester.....	On June 7 stranded in Quebec harbour. Preliminary inquiry was held on June 19 at Quebec, by Captain L. A. Demers, Dominion Wreck Commissioner. Formal investigation was held on June 24, at Montreal, by Captain J. B. Henry, assisted by Captain J. C. Caine and Captain C. J. Stuart, as nautical assessors. <i>Finding:</i> Casualty due to parting of hawser leading from the starboard bow of the steamer to the tug <i>Belle</i> . Master and pilot both exonerated from all blame.
Margaret Hackett..... 131016	Montreal.....	On July 16 collided in Lake St. Peter. Formal investigation was held on July 23 and 30, 1920, at Montreal, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Chas. Lapierre and Captain C. J. Stuart, as nautical assessors. <i>Finding:</i> Mate, O. Portelance of tug <i>Margaret Hackett</i> , solely to blame for collision. His certificate No. 7584 was cancelled. Master of SS. <i>Maplehurst</i> , Kenneth La Rush, found in default for not carrying properly constructed lights and is severely reprimanded, and is also censured for not making more inquiries into the condition of his barge in tow <i>Brookdale</i> and tug <i>Margaret Hackett</i> after the collision.
Brookdale..... 137968 (in tow of SS. <i>Maplehurst</i> )	Montreal.....	
Montcalm..... 117,069	Ottawa.....	On July 26 collided at Quebec. Formal investigation was held on August 5 at Quebec by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Chas. Lapierre and Captain L. I. Morin, as nautical assessors. <i>Finding:</i> Tug <i>M. E. Hackett</i> ,—which had SS. <i>Montcalm</i> in tow,—and SS. <i>Montcalm</i> , the latter to a lesser degree, responsible for the accident. The master of <i>M. E. Hackett</i> , Henry Paquet, and mate of <i>Montcalm</i> are cautioned to be more careful in future.
Mapledene.....	Montreal.....	
Manchester Division..... 135,769	Manchester.....	On August 14 collided near Morin shoal, river St. Lawrence. Formal investigation was held on August 19, 20 and 24, 1920, at Montreal, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain J. B. Henry and Captain M. H. Robertson, as assessors. <i>Finding:</i> Pilot August Santerre, of <i>Tunisian</i> , committed an excusable error of judgment. He is cautioned.
Tunisian..... 111,248	Glasgow.....	
Metagama..... 136,191	London.....	On September 12, collided and <i>Metagama</i> stranded near Bouchard island, river St. Lawrence. Formal investigation was held on September 16, 1921, at Montreal, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain J. B. Henry and Captain C. J. Stuart, as assessors. <i>Finding:</i> Pilot Wilbrod Gauthier, of <i>Metagama</i> , committed excusable error of judgment.
Wisley..... 118,121	London.....	
Ontario No. 2. 137,978	Montreal.....	On January 23 stranded four miles east of Cobourg. Preliminary inquiry was held at Cobourg on February 16, by Captain H. W. King. Formal investigation was held on March 17 and 18, at Cobourg, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain J. B. Foote and Captain Geo. D. Frewer, as nautical assessors. <i>Finding:</i> Master F. D. Forrest, severely reprimanded and cautioned. First Officer, Walter Kirk's certificate No. 7635, suspended for three months, for neglect to reduce speed and not calling master when time for trip had about ended without sighting lights.
Prince Albert..... 120,584	Prince Rupert.....	On March 30, 1920, collided near Dead Tree point, Graham island, B.C. Formal investigation was held on May 6 and 7, 1920, at Vancouver, B.C., by Captain John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Captain Gerald E. Bridge and Captain James R. Stewart, as nautical assessors. <i>Finding:</i> No one to blame, collision being an inevitable accident.
Prince John.. 120,472	Prince Rupert	



## SESSIONAL PAPER No. 21

STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and foreign vessels, held during the fiscal year 1920-21—*Continued*

Name of Ship and Official Number	Registered Port	Remarks
Picton..... 123,165	London.....	On June 8 struck Laurier pier, Montreal harbour. Formal investigation was held on June 12, 1920, before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain C. J. Stuart and Captain J. C. Cains, as assessors. <i>Finding:</i> Pilot Anthime Perreault erred in not exercising proper judgment. He is reprimanded and cautioned to be more careful in future. The court also cautioned master, Mathias Mathias, of SS. <i>Picton</i> , for having ordered the ship to leave her berth before everything was in order. Captain C. J. Stuart, assessor, did not agree with part of the finding, viz.: exonerating the tugs towing the ship.
Perreault, Pilot Alexis.. (Montreal District)	.....	Charged with inebriety while on duty on SS. <i>Canadian Miner</i> June 23 and 24, 1920, and at Quebec. Formal investigation was held on July 6 at Quebec, and July 14 at Montreal, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner. <i>Finding:</i> Considering the past satisfactory record of Pilot Alexis Perreault the court only suspends his license from June 24 to the end of season of navigation of 1920.
Edward Pyke.... 76,556	..Liverpool..	On September 5, stranded below Sillery wharf, Quebec harbour, whilst towing sailing vessel <i>Grand Duchess Maria Nicolaerna</i> . Formal investigation was held on October 7 at Quebec before Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Chas. Lapierre and Captain J. Couette, as assessors. <i>Finding:</i> Both master, Axel Larsen, and Pilot Arthur Arcand, failed to exercise prudence. Master ordered to pay costs of investigation. Pilot was fined \$150. Pilot Edward Devilliers, of sailing vessel, was severely reprimanded and cautioned to be more careful in future.
Prince Rupert... 129,743	New-Castle...	On September 29 stranded at Swanson bay, B.C. Formal investigation was held on November 15, 17 and 18, 1920, at Vancouver, by Captain John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Captain John Park and Captain G. E. Bridge, as nautical assessors. <i>Finding:</i> Both master and mate found in default. Captain Duncan Mackenzie's master's certificate 3667, suspended for four months; mate, R. Mackenzie's certificate, No. 7055, suspended for two months.
Princess Royal.... 121,968	Victoria	On October 18 collided at entrance to Victoria harbour. Formal investigation was held December 9 and 10, at Victoria, B.C., before Captain John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Captain F. W. Evans and Captain G. E. Bridge, as nautical assessors. <i>Finding:</i> Master of <i>Charmer</i> , Charles Campbell, to blame for collision. His certificate, No. 2196, is suspended for one year and he is ordered to pay the costs of the investigation.
Charmer 100,793	Victoria.	
Princess Royal.... 121,988	Victoria.....	On November 6, collided in Grenville channel. Formal investigation was held on December 1, 2 and 3, 1920, at Vancouver, B.C., by Captain John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Captain F. W. Evans and Captain A. P. W. Williamson, as nautical assessors. <i>Finding:</i> Blame for collision imputed to Thomas Rippon, master of SS. <i>Princess Royal</i> , for failing to comply with rules of road, Art. 16. He is warned to be more careful and prudent in future.
Marmion... 102,622	Vancouver...	
Louisiana (in tow)..... 141,556	Vancouver...	
Princess Beatrice.... 116,405	Victoria.....	On February 10 stranded on Jedekiah island, B.C. Formal investigation was held on March 8 and 9, 1921, at Vancouver, by Captain John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Captain F. W. Evans and Captain A. P. W. Williamson, as nautical assessors. <i>Finding:</i> Casualty due to inexcusable negligence and inattention to duties of first officer, F. R. Springhall who was in charge of watch at time of stranding. His certificate, No. 5539, is suspended for three months. Leniency shown owing to long and good record.
Quebec.... 122,405	Montreal .....	On June 3, 1920, stranded at Three Rivers, P.Q. Formal investigation held on June 21 at Montreal by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Chas. Lapierre and Captain C. J. Stuart, as nautical assessors. <i>Finding:</i> Pilot Edward Gauvreau, unlicensed, erred through over-confidence in his course and is found in default for not having taken a cast of the lead occasionally. First officer showed lack of knowledge as to his duties whilst in charge. He is severely reprimanded and cautioned to exercise better judgment in future.
Romsdalefjord ...	Christiania.....	On December 10 stranded off Sambro, N.S. Formal investigation was held on December 14, 1920, at Halifax, by Commander W. St. G. Lindsay, R.D., R.N.R., assisted by Captain Neil Hall and Captain J. D. MacKenzie, as nautical assessors. <i>Finding:</i> Master, Harry Pay, found guilty of culpable negligence in not taking proper precautions when approaching land at night. Copy of finding forwarded to Norwegian Government.
Roamer... 141,353	Ottawa.....	On November 8 burnt and partially damaged in Quebec harbour. A preliminary inquiry was held on December 14 and January 19, at Quebec, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner. <i>Finding:</i> Responsibility for casualty divided on repair men who failed to prevent a possible leakage of gas, and on master for permitting work to be performed under such conditions.



12 GEORGE V, A. 1922

STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and foreign vessels, held during the fiscal year 1920-21—*Concluded*

Name of Ship and Official Number	Registered Port	Remarks
South American.. 141,857	Montreal.....	On November 18 stranded at Petit Cap, river St. Lawrence. Preliminary inquiry was held November 30, 1920, by Commander H. St. G. Lindsay, R.D., R.N.R. Formal investigation was held on January 6, 1921, at Halifax, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Neil Hall and Captain C. Hunter, as nautical assessors. <i>Finding:</i> Master, William Fraser, failed to give peremptory orders before he went below, as to taking casts of the lead and being called if necessary. His certificate was not dealt with on account of his straightforward statement and good work in taking his ship off and into port safely; but is severely reprimanded and warned to be more careful in future.
Sussex..... 112,686	London... ..	On December 31 stranded in St. John harbour. Formal investigation was held at St. John on January 14, 1921, by Captain W. R. Bennett, assisted by J. C. Chesley and F. W. McKelvey. <i>Finding:</i> Casualty due to error of judgment of Pilot G. W. Miller in not making sufficient allowance for wind and current and in not <del>making sufficient allowance for wind and current and in not</del> astern.
Tuscarora (American Coast guard 111,101)	American.....	On September 7, 1920, was held at Quebec on September 7, 1920, by Captain L. A. Demers, F.R.S.A., Dominion Wreck Commissioner, assisted by Captain Chas. Lapierre and Captain J. Couette, as nautical assessors. <i>Finding.</i> Pilot Ernest Pouliot erred in judgment in not making sufficient allowance for the strong ebb tide. He was ordered to pay the costs of investigation, \$150. The vessel being American copy of finding was referred to United States Government.



## SESSIONAL PAPER No. 21

## STATEMENT of wrecks and casualties reported as having occurred to British and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920

21-52

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Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How struck Iron or wood Steam, or sail	Class Type Tonnage	Port of origin Port of destination	Place where Casualty happened	Particulars of Casualty Names of Master	Lives lost	Loss Total or Partial
Jan. 14....	America..... 132184	31	Montego Bay, Jamaica	Schr.	5	Montego Bay, Jamaica	Montego Bay, Jamaica	Wrecked by W. McBride.	...	Part.
Jan. 24....	Alcedo..... 122650	14	Vancouver.	Steam.	48	Vancouver Hooded	Vancouver, B.C.	Wrecked by W. McBride.	...	Part, \$1,000.
Feb. 13..	A. M. No. 5..... 121719	18	Vancouver	Steam.	164	Vancouver Hooded	Vancouver, B.C.	Wrecked by W. McBride.	...	Part.
Mar. 10..	Alcedo..... (Portugal).	2	(Portugal)	Steam.	50	Portugal	Portugal	Wrecked by W. McBride.	...	Total: Ship, \$35,000. Cargo, \$2,000 Part.
Mar. 18....	Anna Sophie.....	.....	Norway	Steam	.....	Portugal	Portugal	Wrecked by W. McBride.	...	Total.
April 25.	Attainment..... 140081	3	St. John's, Nfld	Schr.	1	St. John's, Nfld	St. John's, Nfld	Wrecked by W. McBride.	...	Part.
April 25..	Avon Queen..... 141071	1	Windor, N.S.	Schr.	60	Windor, N.S.	Windor, N.S.	Wrecked by W. McBride.	...	Part.
May 2...	Alcedo..... 217637	1	New York	Schr.	2	New York	New York	Wrecked by W. McBride.	...	Part.
May 12...	Atikokan..... 131053	25	Port Arthur	Schr.	2	Port Arthur	Port Arthur	Wrecked by W. McBride.	...	Part.
May.....	Arthur H. Swicker... 141046	2	Lambton	Schr.	7	Lambton	Lambton	Wrecked by W. McBride.	...	Part.
July 2...	Alma L. Young..... 122490	42	Charlottetown	Schr.	25	Charlottetown	Charlottetown	Wrecked by W. McBride.	...	Total, \$500.
July 19...	Annie Girl.....	49	Port of, Me	Schr.	31	Port of, Me	Port of, Me	Wrecked by W. McBride.	...	Part, \$1,500.
Aug. 15...	Alcedo..... 122650	14	Vancouver	Steam.	48	Vancouver	Vancouver	Wrecked by W. McBride.	...	Part 7,000
Nov. 20...	Augusta Evelyn..... 107,603	20	Yarmouth	Schr.	17	Yarmouth	Yarmouth	Wrecked by W. McBride.	...	Total



STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920—*Continued*

## COASTING AND SEA-GOING WRECKS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register- Ton- nage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Dec. 8.	Annie B. Anderson 138474	3	Parrsboro	Schr.	466	Alicante Sp. Havana.	Virgin Is. Group	Stranded E. H. Kirby.	.....	Total
Dec. 28.	Arlic	4	Tacoma, U.S.	Wood. Sail. Schr.	29	Ketchikan Tacoma.	Arthur Passage, Har- bert reef, B.C.	Stranded I. Stammes.	.....	Part.
Jan. 18.	Buffalo Bridge 218821	3 mos.	New York	Gas. F. & A. Steel. Steam.	2,174	Lisbon New York.	Lat. 41° 40' N. Long. 50° 05' W. N. Atlantic.	Loss of propeller blades. J. F. Krager.	.....	Part.
Mar. 1.	Bohemian 113400	19	Liverpool	Schr. Steel. Steam.	5,544	Boston Liverpool.	Off Sambro Is., Nova Scotia.	Stranded E. C. Hiscoe.	6	Total.
Mar. 25.	Bessie A. White 141,266	1	Parrsboro	Schr. Wood. Sail.	895	St. John, N.B. Yarmouth, N.S.	At mouth of Yarmouth harbour.	Stranded L. T. Merrian.	.....	Part.
May 19.	Bay Queen 97188	28	Barrington.	Schr. Wood. Sail.	32	Shelburne Halifax.	Near Cape LaHave.	Foundered Nickerson.	.....	Total.
June 19.	Bitche	1	LaHave.	Wood. Sail. Steam.	660	Quebec	Quebec harbour.	Collided with wharf Charles Sautrel.	.....	Part.
June 22.	Blake 111724	16	Charlottetown	Schr. Wood. Sail.	99	Richards Har., N.Y. St. Pierre, Miquelon.	Boston Bay, N. Atlantic.	Sprung a leak. F. Young.	.....	Part.
July 16.	Brookdale 137968	32	Montreal	Barge Wood. Gas. Schr.	1,665	Montreal Port aux Quilles.	Booy L. 25. L. St. Peter.	Collided with <i>Margaret</i> <i>Hackett</i> .	.....	Part.
Aug. 22.	Benjamin A. Smith	12	Gloucester, Mass.	Wood. Gas. Schr.	75	Gloucester Fishing.	Gull Rock, N.S.	A. DeRepentigny. Stranded J. S. Thomas.	.....	Part, \$3,000.
Sept. 26.	Beryl 140,929	19	Ottawa	Tug Steel. Steam.	23	Nitinat Nitinat, B.C.	Lat. 48° 39' N. Long. 124° 52' W. Vancouver Is.	Foundered E. A. Freeman.	.....	Total.
Nov. 13.	Ballena 100,635	28	Vancouver	Schr. Wood. Steam.	544	Vancouver Squamish.	Vancouver harbour.	Burnt. J. A. Gates.	.....	Total.
Jan. 12.	Canadian Spinner 141,451	1	Montreal	Schr. Steel. Steam.	3,330	Montreal Halifax.	River and Gulf of St. Lawrence.	Damaged in ice J. M. Keith.	.....	Part.
Jan. 13.	Cape Nord 141210	14	Vancouver.	Schr. Wood.	1,185	Cardiff Gibraltar.	Off Rabat, N. Atlantic.	Engine piston broken. J. B. Ritchie.	.....	Part.



## SESSIONAL PAPER No. 21

Jan. 21.	Cassandra 124130	14	Glasgow	F. & A. Iron.	5, 221	Glasgow, Halifax.	Halifax harbour.	Collision with <i>K. W. Roe</i> <i>bing</i> .	Part.
Feb. 13	Chamier, 100793	34	Victoria	Iron Steam.	497	Vancouver Nanaimo	Near Brockton Pt., Van- couver harbour.	Collision with <i>A. M. No.</i> <i>5</i> .	
Mar. 7	Capo Breton 97808	30	Montreal	Schr. Iron Steam.	1,109	Halifax Leuisburg.	SE. Pt. Seatarie Is.	Stranded W. J. Boyce. J. A. Willet.	Total.
Mar. 20.	City of Lund 126515	11	Vancouver	Schr. Wood Steam.	34	Lund, B.C. Campbell River.	Duncan bay, B.C.	Collision with <i>Admiral</i> <i>Evans</i> .	Total.
July 6.	Charles A. Rutey 138555	3	Lunenburg	Schr. Wood Sail.	360	New York Las Palmas.	Lat. 37° 33' N Long. 66° 29' W. N. Atlantic.	H. Henderson. Damaged in gale Oden Acker.	Part.
Mar. 27	Clansman 107,711	21	Vancouver	Wood Steam.	49	Vancouver. Vancouver.	Vancouver Harbour.	Stranded W. H. Lloyd.	Part: Ship, \$2,000. Cargo, \$2,000. Part.
April 3.	Cap Verte 141220	1	Vancouver	Schr. Motor.	1 173	Hull Bristol.	Off Cross Sand light	Collision with <i>Heslyside</i> Geo. W. Horton.	Part.
April 16.	Celeste 141,572	1	Weymouth	Schr. Wood. Sail.	595	Pensacola Havana.	Havana harbour	Collision with <i>Kannibac</i> Z. H. Richard.	Part, \$1,000.
June 6.	Cuba 71153	45	Montreal	Barre. Wood Sail.	386	Port au Saumon Ogdensburg.	2 miles below Berthier en bas, River St. Law- rence.	Foundered Geo. Leboeuf	Total.
June 23.	Canadian Miner 141508	1	Montreal	Steel.	1,043	Montreal. Charlottetown.	Off Batiscan River St Lawrence.	Stranded. Mcgregor Fraser.	Part.
Aug. 16.	Cavalier 200809	16	Gloucester, Mass	Schr. Wood. Sail.	96	Gloucester Gloucester.	Off Lockeport, Nova Scotia.	Stranded Robert Porper	Part. \$15,000.
Aug. 29.	Centreville 100,549	24	Digby, N. S.	Wood Steam.	32	Parr-boro Pulnico.	West End Digby Gut, N.S.	Stranded. H. P. Amoro.	Slight.
Sept. 7.	Cap Nord 141191	2	Vancouver	F. & A. Wood	1,184	New York Bristol.	Lat 40° 10' N Long. 60° 30' W. N. Atlantic.	Damaged in gale W. P. Evans	Part.
Sept. 13.	Charles A. Rutey 138555	3	Lunenburg	Aux. Schr. Wood	360	Lunenburg Lunenburg	Rose Head Lunenburg, N.S.	Stranded O. Acker.	Total, \$50,000
Oct. 4.	Canadian Drifter No. 54.	3	Quebec	Schr. Wood.	100	Halifax Inverness, Scot.	Lat. 46° 4' N. Long. 33° 51' W. N. Atlantic.	Foundered A. W. Park.	Total.
Oct. 9	Cumberland Queen 141514	1	Parr-boro	Schr. Wood.	644	Preston Jacksonville	5 miles WNW of Sker- ries.	Collided with <i>Stem Gal</i> <i>Ion</i> .	Part.
Oct. 18	Chamier 100793	33	Victoria	Schr. Steel.	496	Vancouver Victoria.	Outside Victoria Har- bour	R. H. Burgess. Collision with <i>Princess</i> <i>Royal</i> .	Slight.
Oct. 21	Clama 120508	15	London	Schr. Steel Steam.	1,977	Montreal West Africa	Belcherasse Is River St Lawrence.	Stranded Charles Campbell.	Part, \$200,000.
Oct. 28.	Chinampa 212766	17	New York	Schr. Steel Steam.	4,533	Tuxpan Montreal.	Montreal harbour	Stranded. E. W. Miller.	Part.
Nov. 8.	Clansman 167711	21	Vancouver	Wood Steam.	49	Vancouver Vancouver	Vancouver harbour.	Stranded R. W. H. Lloyd.	Part: Ship, \$1,000. Cargo, \$2,000 Part.
Oct. 30.	Clare Hughes 148084	10	London	Schr. Steel. Steam.	3,099	Miramichi Pictou	Amet Island, N.S	Stranded. B. H. Nesbitt.	



12 GEORGE V, A. 1922

STATEMENT OF wrecks and casualties reported as having occurred in British, Canadian and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920—Continued

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registry Port	Material Type of Ship	Re- stor- ation Name	Place where Casualty occurred	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Nov. 11	Canadian Gannet 144175	1	Montreal	Steel. Steam.	144	off Cape N. 11° 58' 78' W. Atlantic.	Propeller shaft and pump broken. Charles Wallace stranded. J. B. Walker.	Part.	Part.
Nov. 27	Canadian Seigneur 144165	1	Montreal	Steel. Steam.	154	off Cape N. 18° 58' 18' W. Atlantic.	Stranded.	Part.	Part.
Dec. 12	C.F.C. No. 2 14725	8	Vancouver	Wood. Sail.	87	off Cape N. 18° 58' 18' W. Atlantic.	Stranded.	Total.	Total.
Jan. 26	Doris & Rita 14979	3 mo.	Liverpool, N.	Wood. Sail.	111	off Cape N. 18° 58' 18' W. Atlantic.	Abandoned. C. B. Mason.	Total.	Total.
Feb. 11	Doris & Rita 14979	14	Halifax	Wood. Sail.	99	off Cape N. 18° 58' 18' W. Atlantic.	Damaged in gale. N. Goss.	Part.	Part.
Feb. 11	Doris & Rita 14979	12	Liverpool, N.	Wood. Sail.	93	off Cape N. 18° 58' 18' W. Atlantic.	Wreck in gale.	Total, \$500.	Total, \$500.
Oct. 4	Doris & Rita 14979	49	Halifax	Wood. Sail.	44	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. St. S. Cain.	Total, \$1,200.	Total, \$1,200.
Nov. 8	Doris & Rita 14979	...	Leeds	Wood. Sail.	10	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. A. C. Liddle.	Part.	Part.
Nov. 26	Doris & Rita 14979	11	Halifax	Wood. Sail.	99	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. Nathaniel Goss.	Part.	Part.
July 2	Doris & Rita 14979	2	Montreal	Wood. Sail.	99	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. Charles Richter.	Part.	Part.
June 18	Doris & Rita 14979	28	St. John, N.B.	Wood. Sail.	190	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. Abner Neaves.	Total.	Total.
Oct. 29	Doris & Rita 14979	49	Vancouver	Wood. Sail.	76	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. R. F. Armstrong.	Total.	Total.
Dec. 3	Doris & Rita 14979	11	Charlottetown	Wood. Sail.	90	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. Edward Sadley.	Total, \$6,000.	Total, \$6,000.
Jan. 1	Doris & Rita 14979	2	Liverpool, N.	Wood. Sail.	93	off Cape N. 18° 58' 18' W. Atlantic.	Stranded. Fenton Shankle.	Total, \$30,000.	Total, \$30,000.



## SESSIONAL PAPER No. 21

Date	Name	Age	Sex	Place of Birth	Occupation	Remarks	Part
Jan. 24	Flora L. Oliver 20517	30	F	Halifax	Wool.	Stranded, A. M. Brown.	Part, \$10,000.
Jan. 24	F. W. Roobling 115782	17	M	Boston	Wool.	Collision with SS. <i>Clara</i> .	Part.
April 13	Fannie Belle Atwood.	17	F	Boston	Wool.	Stranded, Douglas Malone.	Part, \$8,000.
Oct	Francis Willet 111401	21	M	London	Wool.	Stranded, George Carter.	Total, \$8,000.
Jan. 2	G. H. Murray 111229	3 mos	M	Weymouth	Wool.	Stranded, Thomas J. Boudroil.	Total, \$64,000.
Jan. 14	General Morrison 140995	1	M	Toronto	Wool.	Stranded, Dan. Maquire.	Part.
Jan. 16	Generaline Wolvin 138374	2	F	Vancouver	Wool.	Stranded, Dan. Maquire.	Part.
Jan. 17	Generaline Wolvin 138354	2	F	Vancouver	Wool.	Stranded, Dan. Maquire.	Part.
Jan. 18	Generaline Wolvin 140995	1	F	Halifax	Wool.	Stranded, Dan. Maquire.	Part.
April 11	Generaline Wolvin 140971	1	F	Halifax	Wool.	Stranded, Dan. Maquire.	Part.
April 20	Generaline Wolvin 138354	2	F	Vancouver	Wool.	Stranded, Dan. Maquire.	Part.
June 11	Generaline Wolvin 140995	1	F	Halifax	Wool.	Stranded, Dan. Maquire.	Part.
July 20	Generaline Wolvin 141211	7	F	Vancouver	Wool.	Stranded, Dan. Maquire.	Part.
Oct. 21	Generaline Wolvin 5846	7	F	Halifax	Wool.	Stranded, Dan. Maquire.	Part.
Oct. 7	G. R. Crowe 12524	13	M	Toronto	Wool.	Stranded, Dan. Maquire.	Part.
Dec. 8	Generaline Wolvin 138354	17	F	Boston	Wool.	Stranded, Dan. Maquire.	Part.
Mar. 6	Generaline Wolvin 140995	14	F	Boston	Wool.	Stranded, Dan. Maquire.	Part.
April 17	Generaline Wolvin 140995	24	F	St. John	Wool.	Stranded, Dan. Maquire.	Part.
May 10	Generaline Wolvin 138354	29	F	Montreal	Wool.	Stranded, Dan. Maquire.	Part.
July 9	Generaline Wolvin 140995	1	F	Halifax	Wool.	Stranded, Dan. Maquire.	Part.



12 GEORGE V, A. 1922

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920—Continued

COASTING AND SEA-GOING WRECKS

Date of Occurrence	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Regis- ter Ton- nage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Oct. 20	Henry B. Hall 138644	39	Montreal	Wood... Steam.	628	Erie, Pa. Levis.	Off. Sorel, River St. Lawrence.	Collision with <i>N.S. Montreal</i> .	Part.	Part.
Mar. 6	Island Princess 138784	7	Victoria	Wood Steam.	203	Victoria S. Pender Island	Pender canal	Stranded. .... Art. Lalonde.	Part.	Part.
Mar. 26	Impresso 135236	7	Sarnia	Steel... Schr...	1,382	New York	Lat. 43° 45' N Long. 78° 50' W	Damaged in gale W. J. Boyce.	Part.	Part.
Dec. 17	Impressive 135648	2	La Have	Steel... Schr...	341	Riverport, St. Thomas, Virginia Islands.	N. Atlantic Little Bahama Bank, West Indies	Damaged in gale W. G. Tudor.	Part.	Part.
Mar. 10	Jutland 141285	1	La Have	Wood... Schr...	146	Halifax... Western Bank.	North Atlantic	Stranded. .... G. Corkum.	21	Total, \$65,000.
May 22	John M. Wood 141036	1	Lunenburg	Wood... Schr...	273	Lunenburg St. John's, Nfld.	14 miles SE. of Little Hope Island, N. Atlan- tic.	Missing. .... M. Johnson.	Total, \$210,000.	Total, \$210,000.
July 14	John J. Morrow 141778	50	Montreal	Steel... Schr...	1,154	Little Saguenay Ogdensburg.	Lark reef, River St. Lawrence.	Collision with <i>Lake Elsie</i> .	Part.	Total, \$65,000.
Aug. 26	A. McKee 127412	12	Sault Ste. Marie	Steel... Schr...	1,275	Levis	Lark reef, River St. Lawrence.	Stranded. R. Chatelet.	Part.	Total, \$69,000.
Oct. 12	James Caruthers 134748	8	Grimsby, England	Steel... Ketch...	97	Prince Rupert Ketchikan.	Off. White Sand island, B.C.	Stranded. James Lintlop.	Part.	Part.
Jan. 11	King Joseph 125065	11	Parrsboro.	Steel... Schr...	170	Bordeaux Martinique	River Gironde, France	Collision with <i>Tout...</i> W. L. Anderson.	Part.	Part.
Jan. 28	Kenora... 124235	13	Toronto	Steel... Schr...	1,275	Tyne Dock Cork, Ireland.	100 miles S. of Queens- town.	Collision with <i>Tout...</i> T. Parsons.	Part.	Part.
Dec. 5	K. N. No. 2 138300	5	Vancouver	Steel... Schr...	474	Vancouver Powell River.	Trial island, Straits of Georgia.	Condenser burst T. M. Jefferson.	Total: Ship, \$10,000. Cargo, \$45,000. Total, \$55,000.	Total: Ship, \$10,000. Cargo, \$45,000. Total, \$55,000.
Feb. 27	Lavita... 130549	11	Vancouver	Wood... Schr...	8	Vancouver Howe Sound.	Anvil Island, Howe Sound.	Stranded. W. Tickle.	Part.	Part.
Mar. 7	Lake Ellsborough 219919	1	Detroit	Steel... Schr...	1,658	Fowie, G.B. Portland.	Lat. 41° 30' N Long. 60° 30' W.	Damaged in gale L. W. Webb.	Part.	Part.
Mar. 30	Lansdowne 93604	35	Ottawa	Wood... Schr...	463	Halifax Manchester.	Lat. 41° 49' N Long. 58° 52' W. N. Atlantic.	Sprang a leak Wm. A. Beatie.	Part.	Part.



## SESSIONAL PAPER No. 21

July	3	Lake Elwin	.....	American	Steel.....	1,658	Ecosse, Melb New York.	Gabarus rock, Nova Scotia.	Total.
Oct.	1	L'Eboulement 138512	3	Quebec	Steel. Schr..	82	Quebec River St. Marguerite	6 miles off River du Loup Collision with <i>La Mouelle</i> . James Tremblay.	Part, \$1,200.
Oct.	20	Livingstone		Tacoma, Wash	Schr.. Wood. Sail.	25	Prince Rupert Ketchikan.	Prince Rupert harbour Foundered	Part, \$500.
Nov	6	Louisiana 141556	47	Vancouver	Gas. Barge Wood	1,309	Anvox, B.C. Ladysmith.	Granville channel, B.C. Collision with <i>Princess Royal</i> . B. M. Jorgensen.	Part, \$2,975.
Dec.	12	Lloyd George 126821	10	Lunenburg	Steel. Schr..	99	Lunenburg Ponce, Porto Rico.	Anegada reef, Virgin islands.	Total: Ship, \$9,000. Cargo, \$18,000. Part.
Jan.	28	Mabel Stewart 138684	3	Vancouver	Schr.. Wood.	1,272	Cardiff Bordeaux.	Off Scilly islands.	
Jan.	13	Myrtle Piercey 140876	8 mos	Liverpool, N.S.	Steel. Schr..	149	Hermitage Cove, Nfld Oporto.	St Pierre, Miquelon Stranded. Isaac Thornhill.	Slight..
Mar.	6	Marian W 134145	30	Montreal	Wood. Sail.	959	.....	Louise basin, Quebec.	Total.
Mar.	8	Mark H. Cravau 138260	3	Lunenburg	Steel. Schr..	98	Burin, Nfld Gibraltar.	Damaged in gale Louis Rowe.	Part, \$2,250.
Mar.	10	Maid of Lahave 141786	1	Lahave, N.S.	Wood. Sail.	223	Lahave, N.S. Bahia.	Foundered L. Hayes	Total: Ship, \$50,000. Cargo, \$62,000. Part.
Mar	20	Morra Sea 140452	9	Vancouver	Wood. Sail.	17	Vancouver On patrol.	Damaged by fire. W. O. Copp.	
April	13	Maid of Canada 141137	1	Lahave, N.S.	Steel. Schr..	318	New Orleans Oporto.	Luxer harbour, Portugal Collided with break- water.	Part, \$10,800.
June	7	Manchester Division. 135429	1	Manchester	Steel. Schr..	3,774	Manchester Quebec	Quebec harbour Stranded. J. B. Wilkie. P. Linton.	Slight.
July	8	Margaret 141124	13	Halifax	Steel. Wood..	199	Halifax Ship Harbour.	Friars Breakers, off Owl's Head	Part, \$1,500
July	16	Margaret A. Hackett 134016	8	Montreal	Steel. Schr..	83	Quebec Montreal.	Buoy I. 25, lake St. Peter Collision with <i>Brookdale</i> . M. Allison.	Part, \$15,000.
Jul.	23	Margaret H. H. H. 138353	3	Vancouver	Steel. Schr..	800	Kotka Ostend.	20 miles N-NW. Dager- ort, N. Baltic.	Part.
July	27	M. J. Park 141184	1	Lahave, N.S.	Steel. Schr..	117	Lahave, N.S. Fishing.	2 miles E. of Aquafort, Nfld.	Total, \$57,000.
Aug	13	Montara 80808	39	New York	Steel. Schr..	1,695	Philadelphia Louisburg.	Off Louisburg Stranded. W. G. Bang.	Total.
Aug	14	Manchester Division 135369	2	Manchester	Steel. Schr..	3,774	Manchester Quebec.	Off Morin shoal, River St. Lawrence	Partial.
Aug	19	Manon 215621	8	Dalryle, Man	Steel. Schr..	2,880	Quebec Montreal.	Cape Charles, River St. Lawrence Stranded B. H. Morehouse	Partial, \$60,000
Aug	20	Maid of Brazil 138801	2	Weymouth, N.S.	Steel. Schr..	387	New Campbellton Rotterdam.	35 miles S-SW Stark point. Damaged by fire H. Christian.	Partial.



STATEMENT of wrecks and casualties reported as having occurred to British and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to April 1, 1922. *Continued*

CANADA AND FOREIGN VESSELS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Place of Origin	How damaged	Registered Tonnage	Port of destination Port of arrival	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Aug. 31	Maggie Mac 96805	20	Hull	Sched. Wood.	60	Leith Br. Or Glasgow	Collided with dock H. Lowe.	.....	Total, \$3,500.
Sept. 12	Metagama 136791	5	London	Sched. Steel	7 655	Leith Glasgow	Stranded H. Turnbull.	.....	Slight.
Sept. 13	Mary J. O'Neil 141611	1	London	Sched. Steel	160	London Glasgow	Stranded H. Turnbull.	.....	Total, \$40,000.
Oct. 18	Mammoth 130295	10	Vancouver	Sched. Wood	9-6	London Glasgow	Stranded H. Turnbull.	.....	Total.
Sept. 12	Minnie Mae 141611	28	Charleston	Sched. Wood	76	Charleston H. Turnbull.	Stranded D. Murray.	.....	Part, \$2,500.
Oct. 20	M. L. Washburn 20441	9	Armenia	Sched. Wood	179	Wilmington H. Turnbull.	Stranded H. Turnbull.	.....	Part.
Oct. 20	Minnie M. Cook 107952	19	London	Sched. Wood	1	London H. Turnbull.	Stranded H. Turnbull.	.....	Total. \$6,500.
Nov. 6	M. L. Washburn 141611	27	Vancouver	Sched. Wood	121	London H. Turnbull.	Stranded H. Turnbull.	.....	Part.
Nov. 11	M. L. Washburn 14117	2	La Hava, N.S.	Sched. Wood	330	London H. Turnbull.	Stranded H. Turnbull.	.....	Part.
Nov. 18	Meredith A. White 141479	2	Port Lora	Sched. Wood	490	London H. Turnbull.	Stranded H. Turnbull.	.....	Part.
Nov. 22	Margaret E. Dick 140259	2	Windsor	Sched. Wood	600	London H. Turnbull.	Stranded H. Turnbull.	.....	Total.
May 24	Nashville 141735	5	Vancouver	Sched. Wood	255	London H. Turnbull.	Stranded H. Turnbull.	.....	Part, \$2,000.
Nov. 9	Nashville 12277	12	Victoria	Sched. Steel	166	London H. Turnbull.	Stranded H. Turnbull.	.....	Part.
Nov. 23	Nashville 112288	17	Digby	Sched. Steel	225	London H. Turnbull.	Stranded H. Turnbull.	.....	Part. Ship, \$1,000. Cargo, \$550.



July 19.	Cassidy 94625	1	Halifax	Sold Wood	60	London Harbour St. John's	Foundered L. A. Hopkins	Total.
Oct. 4.	Ohio 134096	7	Yarmouth	Wood	60	Yarmouth Port	Part Peter Feltone	Total, \$6,000
Jan. 3.	Prince George 129748	10	Newcastle	Wood	100	Yarmouth Yarmouth	Collided with <i>Yarmouth</i> " <i>Yarmouth</i>	Part.
Jan. 18.	Portland 245457	21	New York	Wood	60	New York Antwerp	Part Donnell	Part.
Jan. 23.	Prince Albert 99584	28	Prince Rupert	Wood	57	Prince Rupert Prince Rupert	Part Robinson	Part.
Feb. 15.	Prince George 129748	10	Newcastle	Wood	100	Yarmouth Yarmouth	Part Donnell	Slight
Mar. 30.	Prince Albert 99584	28	Prince Rupert	Wood	57	Prince Rupert Yarmouth	Part Robinson	Part.
Mar. 30.	Prince John 129742	10	Prince Rupert	Wood	50	Yarmouth Yarmouth	Part Robinson	Part.
July 23.	Prince George 129748	10	Newcastle	Wood	100	Yarmouth Yarmouth	Part Robinson	Slight
Aug. 22.	Prince 5637	6	Stockholm	Wood	20	Stockholm Yarmouth	Part Robinson	Part.
Sept. 22.	Prince 94643	31	Montreal	Wood	100	New York Yarmouth	Part Robinson	Part.
Sept. 29.	Prince Rupert 129743	10	Newcastle	Wood	100	Yarmouth Yarmouth	Part Robinson	Part.
Oct. 18.	Prince Rupert 121088	13	Yarmouth	Wood	60	Yarmouth Yarmouth	Part Robinson	Part.
Nov. 7.	Prince 141108	30	Yarmouth	Wood	40	Yarmouth Yarmouth	Part Robinson	Part.
June 16.	Q. J. T. 106706	13	Yarmouth	Wood	100	Yarmouth Yarmouth	Part Robinson	Total.
Nov. 11.	Queen City 106706	20	Yarmouth	Wood	100	Yarmouth Yarmouth	Part Robinson	Total, \$17,500.
Feb. 1.	Ruth Hockenman 106706	1	Halifax	Wood	100	Yarmouth Yarmouth	Part Robinson	Total.
April 8.	Ruth Hockenman 106706	7	Yarmouth	Wood	100	Yarmouth Yarmouth	Part Robinson	Part.
June 8.	Ruth Hockenman 106706	1	Montreal	Wood	100	Yarmouth Yarmouth	Part Robinson	Part, \$6,000
June 25.	Ruth Hockenman 106706	7	Yarmouth	Wood	100	Yarmouth Yarmouth	Part Robinson	Part.
July 28.	Ruth Hockenman 106706	2	Yarmouth	Wood	100	Yarmouth Yarmouth	Part Robinson	Part.



12 GEORGE V, A. 1922

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920—*Continued*

COASTING AND SEA-GOING VESSELS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Regis- ter Ton- nage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Aug. 4	Rexmilitie 13872	2	Sarnia	Trawler Steel. Steam.	1,394	New York Massena	N. Atlantic	Damaged by gale W. R. Smeltzer.	...	Part.
Aug. 4	Rexpond 13768	7	Victoria	Tug. Wood. Steam.	16	Victoria, Cienoa Bay	Burns Island, Sampson Narrows, B.C.	Stranded. G. Morall.	...	Part.
Dec. 4	Rexvokle 12838	10	Toronto	F. & A. Steel. Steam.	1,176	Port Talbot, Larochele.	Belle Isle Roads Bay of Biscay.	Foundered K. Shoewark.	...	
Dec. 10.	Romsdalsjord	12	Christiania	Schr.... Steel. Steam.	3,242	Narvik, Norway Baltimore.	Sisters Ledge Sambro, N.S.	Stranded Harry Pay.	...	Total.
Jan. 19	St. Ann 129365	16	Vancouver	Wood. Glas. Schr.	6	Seaside Howe Sound, Halifax harbour	Howe Sound	Burnt G. E. Cafes.	...	Total.
Feb. 19	Shelba 129326	8	Ottawa	Schr. Steel. Steam.	1,341	Halifax harbour	Halifax harbour	Struck pier	...	Slight.
Feb.	Stella Maris 117525	39	Windsor	Tug. Steel. Steam.	54	Mahone Bay, N.S.	Mahone Bay	Caught in ice, propeller damaged.	...	Part.
May 19	Samuel Marshall 107126	31	Brockville	Wood. Steam.	540	Sorel Ogdensburg	Ogdensburg	Collision with <i>Liberty</i> . Ludger Marchand.	...	Part.
Aug. 22	Scandinavia 109411	22	Glengow	Schr.... Steel. Steam.	7,739	Antwerp Montreal.	Quebec harbour	Damaged propeller R. G. Latta.	...	Part.
Oct. 3	Selkirk 67835	19	Victoria	Wood. Steam.	490	White Horse, Y.T. Dawson.	Mouth of Stewart river, Y.T.	Stranded. M. Campbell.	...	Part.
Nov. 9	St. Michael 137009	2	Toronto	Schr.... Steel. Steam.	1,670	St. Nazaire Marseilles	Lat. 28° 12' N. Long. 15° 15' W	Circulating pump broken. Louis Pen.	...	Part.
Nov. 18	South American 141857	New	Montreal	Schr.... Steel. Steam.	1,309	Montreal Dalhousie.	Little Cape, Gaspe	Stranded Wm Fraser.	...	Part.
Jan. 1	Two Sisters 92749	24	Sackville	Schr.... Wood. Sail.	86		Struck off Quaco ledge, St. Martins, N.B.	Stranded.	...	Total.
May 26	Tussle 167884	5	Lunenburg	Wood. Steam.	67	Arichat Port Mulgrave.	Sand Point, entrance to Str. of Canso.	Stranded G. D. Pentz.	...	Part.
Aug. 13.	Tusatoro		American	Schr.... Steel. Steam.	492	New York Milwaukee.	Hare Island R. St. Lawrence.	Stranded Eug. Blake, jr.	...	Part.



## SESSIONAL PAPER No. 21

Aug.	14.	Thomas Keag 28119	22	Bergen, Nor.	Schr., Steel.	2,242	Sydney, N.S. Montreal.	White Island lightship River St. Lawrence.	Stranded, B. Schjott.	Part.
Sept.	15.	Tyndareus, 137527	4	Liverpool.	Steam. Schr., Steel.	7,172	Hong Kong, Union Bay.	Off Atkinson Pt. Burrard Inlet.	Collided with crib of shingle-bolts.	
Dec.	2.	Teton 141329	2	New Westminster.	Steam. Schr., Wood.	17	Prince Rupert, Fishing.	Peril Bay, Graham Is., B.C.	Stranded B. Hansen.	Part.
Dec.	3.	Turret Court, 106608	24	Montreal.	Schr., Steel.	1,197	Clarenville, Nfld. Sydney, N.S.	Lat. 46° 30' N. Long. 56° 30' W.	Engine trouble. C. W. Kenny.	Part.
Dec.	4.	Thomas Crosby 141434	1	Vancouver.	Sloop, Wood.	22	Sandspit	Skidegate inlet	Foundered Win. Oliver	Total.
Nov.	13.	Uressa Belle 112120	17	Lunenburg	Gas. Schr., Wood.	95	Dog Bay.	Newton harbour	Stranded C. Barber.	Total, \$7,000.
Feb.	26.	Vincent A. White 138478	2	Parrsboro.	Schr., Wood.	452	Bangor Menos.	Powey harbour	Collision with <i>Goliath</i> T. M. Nicholls.	Part, \$250.
Sept.	2.	Venture, 129171	10	Victoria	Sail. F. & A.	580	Vancouver Skeena River.	Grenville channel, B.C.	Collision with <i>Florence</i> & <i>Lac</i> . James E. Noel.	Slight.
Sept.	31.	Venosta, 139959	3	Grimsby.	Steel. Steam.	128	Port Hawkesbury, Fishing.	Straight of Canso	Stranded. Geo. Meyhre.	Part.
Jan.	20.	Victory Chimes 134210	2	Charlottetown	Steam.	294		Off Cape St. Vincent.	Sprung a leak.	Part.
Jan.	20.	W. T. White 131175	7	Lunenburg	Schr., Wood.	199	Santo Paula Fortune bay.	S.E. of Cape Race, North Atlantic.	Damaged in gale and abandoned. R. Williams.	Total.
April	11	Wakena 208632	9	Seattle	Sail. Wood.	316	Seattle Victoria.	Pulford reef	Stranded. J. P. Kelly.	Part.
April	19	Wabash 126247	11	Victoria.	Gas. Schr., Wood.	8	Victoria	Shoal bay, B.C.	Stranded. A. W. Watson.	Total.
April	20	Westgate 91188	35	Liverpool.	Gas. Iron	1,813	Perth Amboy Halifax.	Lat. 42° 0' N Long. 65° 30' W	Abandoned H. H. Steel.	Total
July	24	Wildomino 141302	1	Halifax.	Schr., Steel.	4,173	Lushon Halifax.	White island off Canso	Stranded J. Beeby.	Part.
Sept.	12	Wislev 115121	16	London.	Steam. Schr., Steel.	2,717	Sunderland Montreal.	Isle Bouchard, River St. Lawrence.	Collision with <i>Malagana</i> T. S. Bower.	Slight.
Nov.	10	W. S. MacDonald 141258	1	Yarmouth	Steam. Schr., Wood.	382	St Andrews, Fla. Grenada.	Gulf of Mexico and Atlantic ocean.	Damaged in gale John Duffy	Part.
Nov.	13.	W. M. Richard 126598	10	Annapolis, N.S.	Schr., Wood.	323	Bridgetown, Bar. Macoris, San Dom.	Lat. 28° 45' N Long. 79° 36' W.	Foundered T. J. Boudrot.	Total.
Jan.	18	Yarmouth. 93373	32	Yarmouth	Schr., Iron. Steam.	724	New York Havana.	Lat. 39° 00' N. Long. 74° 12' W.	Damaged in gale J. Cockburn.	Slight.



12 GEORGE V, A. 1922

STATEMENT of wrecks and casualties reported as having occurred to British Canadian fishing vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920 *Continued*

TABLE A-10

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How damaged	Tonnage	Part of Hull Preserved	Place of Casualty	Particulars of Casualty	Lives lost	Loss Total or Partial
May 19.	Andre Depere. 14179	1	Montreal	Wood Steam.	106	Partial (top)	St. Lawrence River	Struck by iceberg.	...	Slight.
July 3.	Amaranthe.	50	Detroit	Sch. Steam.	744	Bottom	Windsor passage on Lake Superior	Struck by iceberg.	...	Partial.
Aug. 29	Advance. 8942	36	Montreal	Steel Steam.	278	Clashed	St. Lawrence River	Struck by iceberg.	...	Partial, \$5,000.
Nov. 11.	Aurora. 16208	17	Plattsburg	Steel Steam.	97	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
July 9	Baile.	...	American	...	...	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
May 5	Cataraugus. 77698	1	Montreal	Iron & steel. Steam.	571	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
Dec. 2	Chippewa. 220783	1	Detroit	Steel. Steam. Tug.	140	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
Nov. 4.	Dellwyn. 96859	30	Sarnia	Wood.	26	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
Nov. 12.	Francis Widlar. 209910	16	Fairport, O.	Steel Steam.	9	Bottom	St. Lawrence River	Struck by iceberg.	...	Total.
Sept. 15	Garry. 134253	6	Winnipeg	Tug. Wood. Steam.	4	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
May 11.	Henry Pedwell. 126058	4	Owen Sound	Wood. Steam.	17	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial.
Oct. 16	Helen C. 129654	46	Detroit	Wood. Steam.	139	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial, \$7,000.
June	Isleway. 116559	16	Montreal	Wood. Steam.	9	Bottom	St. Lawrence River	Struck by iceberg.	...	Partial, \$1,500.
July 15	John Gaskin. 86665	40	Montreal	Wood. Steam.	67	Bottom	St. Lawrence River	Struck by iceberg.	...	Total, \$10,000.
Oct. 11.	Joyland.	36	Montreal	Wood. Steam.	1,076	Bottom	St. Lawrence River	Struck by iceberg.	...	Part, \$20,000.



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STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1920—*Concluded*

INLAND WATER WRECKS *Concluded.*

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
May 26	Wyoming . . . . .	33	Montreal . . . . .	Wood. Steam.	911	Montreal	1 mile N.E. of Butternut island, Lake St. Frances.	Stranded E. Walkinshaw.		Partial, \$100.
Nov. 11	W. C. Lafontaine . . . . . 163541	12	Plattsburg, N. Y. . . . .	Barge. Wood.	99	Three Rivers Burlington.	Mouth of Batiscan river.	Stranded . . . . . L. N. Sanschargin.		Partial.
Nov. 26	Windsor . . . . . 125986	1	Montreal . . . . .	Wood. Steam.	1,068	Oswego Toronto.	Lake Ontario, near Duck island.	Damaged by storm. J. B. Norris.		Part.
Mar.	Chambly . . . . . 130417	10	Montreal . . . . .	Wood. Steam.	218	Moored near Morrisburg	Near Wallaceburg, river Sydenham.	Fire . . . . .		Total.
Nov. 15	Maplegulf . . . . . 141752	31	Montreal . . . . .	Wood. Steam.	493	Montreal . . . . . Sarnia.	Lake Ontario . . . . .	Damaged in heavy weather. Thomas McLeod.		Total, \$50,000.



## SESSIONAL PAPER No. 21

## MASTERS AND SEAMEN BRANCH

## REPORT OF B. F. BURNETT, SUPERINTENDENT

During the fiscal year 1920-21, navigation schools were in operation at St. John, N.B., Halifax, N.S., North Sydney, N.S., Yarmouth, N.S., and at Quebec, P.Q.; and marine lectures were delivered at Collingwood, Ont., and at Vancouver, B.C.

Examinations for masters' and mates' certificates were held at Halifax, N.S., Yarmouth, N.S., North Sydney, C.B., Charlottetown, P.E.I., St. John, N.B., Quebec, P.Q., Montreal, P.Q., Ottawa, Ont., Kingston, Ont., Toronto, Ont., Collingwood, Ont., Port Arthur, Ont., West Selkirk, Man., Edmonton, Alta., Nelson, B.C., Prince Rupert, B.C., Vancouver and Victoria, B.C.

Issued during the year: 12 masters', 12 mates' and 22 second mates' sea-going certificates of competency; 20 masters' and 2 mates' sea-going certificates of service; 80 masters' and 94 mates' coasting certificates of competency; 36 masters' and 54 mates' inland waters certificates of competency; 35 masters' and 19 mates' minor inland waters certificates of competency; 24 masters' and 1 mate's service coasting certificates and 39 masters' temporary certificates.

During the year 22,569 seamen were shipped at the various shipping offices.

## PILOTAGE REPORT

## CAPT. G. E. L. ROBERTSON, SUPERINTENDENT GENERAL

The Honourable the Minister of Marine and Fisheries is the pilotage authority for the pilotage districts of Halifax, St. John, N.B., Montreal, and Quebec, and all matters relating to pilotage are dealt with through the local superintendents at the above-mentioned places.

There are 60 pilots and 8 apprentices in the Quebec district. The gross earnings of these pilots was \$143,034.74, giving an average of \$2,383.91 to each pilot.

The total number of ships piloted inward and outward was 1,903 of a total net tonnage of 5,070,642.

In this district 7 per cent of the gross earnings of the pilots is deducted for the Pension Fund. This fund is administered by the Quebec Pilots' Corporation, and amounted on December 31, 1920, to \$84,636.72. In addition to the pension received from the corporation certain retired pilots, 30 in number, receive an annual pension of \$300 from the Government.

There are 51 pilots and 4 apprentices in the Montreal district. The gross earnings for these pilots was \$149,881.34, giving an average of \$2,938.88 to each pilot.

The total number of ships piloted inward and outward was 2,004, of a total net tonnage of 4,830,382.

In this district 5 per cent of the gross earnings of the pilots is deducted for the Pension Fund (Montreal Decayed Pilots' Pension Fund), which fund is administered, without charge, for the Montreal pilots by the Department of Finance.

Mr. R. A. Williard, Montreal, is the Acting Superintendent and Mr. F. J. Boulay, Assistant Superintendent, at Quebec.

All expenses for the pilotage services at Montreal and Quebec are paid out of public funds, which amounted to \$7,725.65 for the Montreal district, and \$73,431.66 for the Quebec district, the latter including the cost of maintaining the pilot boat *Eureka* at Father Point, Quebec.



12 GEORGE V, A. 1922

In the Pilotage District of Halifax, there are 15 first-class, 3 second-class pilots and 5 apprentices. The gross earnings for 1920 were \$54,982.55, giving an average of \$3,332.25 for each first-class pilot. New by-laws for the government of this district were prepared and put into force on June 1, 1920. They provide that 5 per cent of the gross earnings are to be deducted for the pension fund. Seventy per cent of the balance is paid to the pilots, and the remaining thirty per cent is retained for expenses, if required. The Pension Fund is administered, without charge, for the Halifax pilots by the Department of Finance. The pilots have been advanced moneys for the purchase of pilot boats.

In this district 1,867 vessels were piloted inward and outward, having a total net tonnage of 3,736,530.

Captain H. St. George Lindsay is the superintendent at Halifax.

The Pilotage District of Saint John, N.B., was formally taken over on October 1, 1920. There are 12 first-class pilots, 2 second-class pilots, and 3 apprentices. The gross earnings of the pilots for the three months ending December 31, 1920, was \$9,379. By-laws for the government of this district have been approved and put into force. Pilots contribute 12 per cent of their gross earnings to the pension fund, which is administered, without charge, by the Department of Finance. Mr. J. C. Chesley, Saint John, is the acting superintendent.

The pilots of this district have been advanced moneys for the purchase of suitable pilot boats.

The Pilotage District of British Columbia was abolished by Order in Council, dated April 26, 1920.

Of the thirty-seven other pilotage authorities constituted under the authority of the Governor in Council in pursuance of the provisions of the Canada Shipping Act, sixteen have forwarded returns for 1920.

SIGNAL STATION, CITADEL, HALIFAX, N.S.

Record of shipping from April 1, 1920, to March 31, 1921, by F. C. Kilburn, Major, R.C.E., Superintendent of Signals:—

Total vessels reported.. . . .	1,180
Total vessels arrived.. . . .	1,180
Total vessels passed.. . . .	nil

SABLE ISLAND—ANNUAL REPORT, 1920

J. M. CAMPBELL, SUPERINTENDENT

- Government employees, 39; Marconi staff, 5; total, 44.
- Boats.—one life boat (surf boat type), 2 life boats (self bailing type), 2 cargo surf boats, 2 dories, 1 motor launch.
- Life Saving Apparatus.—three Lyle guns and equipment, 2 boat carriages.
- Horses—Tame ponies, 36; wild ponies, estimated, 300. (Shipment of wild ponies should be made in near future).
- Cattle—Thirty-eight head. Killed, 3 head. Weight, 1,790.
- Pigs—Two.
- Boat drills.—Fifteen.
- Gun drills.—Twelve.
- Patrol.—The island was patrolled twice daily during thick weather and storms.
- Wrecks.—None.
- Buildings.—Many of the buildings are old and in need of repair, as reported by letter.



## SESSIONAL PAPER No. 21

## REPORTS OF AGENCIES

## HALIFAX, N.S., AGENCY

New aids to navigation during the year consisted of a gas beacon at Sauls island, a gas and bell buoy at Barrington bay, replacing lightship; at Port Herbert, eight wooden spar buoys, four red and four black; at Canso harbour, two wooden spar buoys, one red and one black.

Repairs were made to the following light stations: Cranberry island, Bear island, Point Tupper, Peggy point, Egg island, Sander, Carter island, McNab's island, George's island, Devil's island, Moser island, Flat point, Betty island, and Lahave.

Changes and improvements in existing aids in the agency were made as follows: Lunenburg harbour, Long shoal, can buoy replaced by gas buoy; Sydney harbour, southeast bar, fixed red light replaced by an occulting white acetylene gas light; Mahone bay, Hobson island, fixed red light replaced by an occulting red acetylene gas light; Mahone bay, West-Haver island, fixed white light replaced by an occulting white acetylene gas light; Great Bras D'Or lake, Whycocomagh, fixed red light replaced by a fixed white light; Sydney harbour, southeast bar, fog bell discontinued; Jordan light on outer end of Jordan bay east side breakwater, light discontinued.

The C.G.S. *Lady Laurier* was employed from April to December, 1920, in the district, and from January to March 7, 1921, when she was blown down for annual repairs.

The C.G.S. *Stanley* was employed in agency work during April and May, 1920, and January to March, inclusive, 1921.

The C.G.S. *Dollard* was employed in the district from February 21 to end of March, 1921.

The C.G.S. *W. H. Lee* was transferred from the Department of Naval Service to the Department of Marine on December 7, 1920. December 7 to 15, under repairs; January 1 to February 26, again under repairs; February 26 to March 31, 1921, employed in district.

The C.G.S. *Montcalm*, employed in agency work from April 1 to April 21, 1920; April 22 to 30, under repairs.

The C.G.S. *Aberdeen*, on December 8, arrived from New Brunswick agency for repairs; January 1 to February 8, under repairs; February 9, sailed for St. John.

The C.G.S. *Nelson*, undergoing repairs at agency wharf from April 1 to July 31, 1920; from August 1 to December 29, 1920, under Fishery Branch; December 30, 1920, to February 28, 1921, employed in agency work.

Lightship *Halifax No. 15*, April 1 to October 5, 1920, on Sambro bank station; October 6 to 16, undergoing repairs at Halifax; October 16 to December 9, at Anticosti; December 9, 1920, to February 8, 1921, under repairs at agency wharf; February 9 to March 31, 1921, on Sambro bank.

## PICTOU, N.S., SUB-AGENCY

Outside buoys were lifted November 30, repaired, painted, and placed in position on May 16, 1920, the work of lifting and replacing the buoys being done by ss. *Bant*.

The deep-water channel from Abercrombie point to New Glasgow was bushed and mark placed on submerged wreck.

Assistance was rendered to steamers *Canadian Miner* and *Canadian Sealer*, and supplies obtained for ss. *Stanley* while on Magdalen island service.

Steamers arrived 223, tonnage 40,128; steamers departed 234, tonnage 46,761; sailing vessels arrived 304, tonnage 20,971; sailing vessels departed 306, tonnage 20,942.



SYDNEY, N.S., SUB-AGENCY

Wharfingers were appointed at Port Hastings, Iona, and Baddeck, and instructed as to their duties. Building material for the light and signal station at Cape Ray, Nfld., was purchased and shipped. All harbour buoys adrift were picked up, and a number of wireless calls (some S.O.S.) answered by sending help when possible.

Port of Sydney	Number of ships	Tonnage
Foreign in.. . . . .	504	698,850
Coastwise in.. . . . .	1,471	792,311
Foreign out.. . . . .	741	931,009
Coastwise out.. . . . .	1,207	544,276
Port of North Sydney—		(
Foreign in.. . . . .	909	359,863
Coastwise in.. . . . .	852	180,787
Foreign out.. . . . .	733	300,446
Coastwise out.. . . . .	1,042	197,862
Port of Louisburg—		
Foreign in.. . . . .	301	162,210
Coastwise in.. . . . .	307	183,687
Foreign out.. . . . .	327	216,609
Coastwise out.. . . . .	334	233,113

CHARLOTTETOWN, P.E.I., AGENCY

The only changes in the agency staff during 1920-21 were the replacing of the district engineer, Mr. J. A. Leger, by Mr. E. E. Clawson, on June '1, 1920, and the appointment of Mr. G. J. Moren as clerk on April 8, 1920.

Work on the marine wharf at Charlottetown was continued. Warehouse No. 1 was reshingled, fitted with eaves, troughs, and drain pipes, and painted. Warehouse No. 2 was painted, and No. 3 placed on a pile foundation on present site. Warehouse No. 4 had north end reshingled and was painted. Hand-power elevators were installed in warehouses Nos. 1 and 2, and the wharf and all buildings were wired for electric lighting.

The work of the superintendent of lights and the inspector of fog alarms was carried on as usual, though somewhat interrupted by storms and fogs. The inspector of fog alarms reports that the fog alarm at the southwest end of Belle Isle had suffered damage by frost to the water-pipe leading to the turbine, and suggests that this station be converted into a standard oil plant.

The C.G.S. *Brant* was employed in the agency from April 23 to December 7, 1920, when she went into winter quarters.

The C.G.S. *Montcalm* was engaged in placing the large buoys in the district from May 13 to May 26, 1920.

The C.G.S. *Stanley* arrived at Charlottetown on May 28, 1920, and after loading supplies for the northern stations sailed on June 6; from June 17 to 25 stuck in heavy ice in mid-straits, from then until September 19, when she went to Halifax for repairs; was employed in general agency work. Returned to Charlottetown October 20, and from then until the end of the season was employed in the vicinities of Belle Isle, Bird Rocks, Cape Anguille, and the Magdalen islands.

The C.G.S. *Rouville* was employed in the district in lighthouse supply work from July 17 to September 20, 1920.

QUEBEC AGENCY

Three new wharves were transferred to the agency during the year, viz., Riviere-aux-Vases (Chicoutimi county), Ste. Luce (Rimouski county), and Trois Lacs (Frontenac county), making a total of 63 in all under agency control; the collections for the year amounted to \$14,714.11.



## SESSIONAL PAPER No. 21

The three light and fog alarm stations on the north shore of Anticosti island at Cap de Rabast, Charleton point and Table head, built during the war, are now in permanent operation, with the result that with their aid many vessels now pass on the north side of the island, shortening the distance between Quebec and the strait of Belle Isle, inward or outward.

A new gas buoy was placed on St. Augustin bar, a diaphone fog alarm on Miscou island to replace steam plant, and the Great Fox River range changed from harbour to lead to Government wharf.

The C.G.S. *Eureka* was employed in pilotage work at Father point from June 16 to the end of the season of navigation; this work in the earlier part of the season being performed by the ss. *Rouville*.

Other Dominion steamers employed at various times in the district were the *Montcalm* and *Druid*, and for winter repairs and supply work the *Lady Grey* and *Bellechasse*.

The winter ferry service between River Ouelle wharf was carried on by the ice-breaker *Montcalm* up to the 3rd of May, when she was sold to the Gulf of St. Lawrence Shipping and Trading Company of Quebec.

## VICTORIA, B.C., AGENCY

Little or no construction work of any importance was done during the year, the work of a new concrete tower at Carmanah point having been postponed.

Two seventy-five foot vessels, one for this agency and the other for the Prince Rupert agency, equipped with semi-diesel engines, were built and handed over by the British Columbia Yacht and Boat Builders Company, Ltd., of Victoria, B.C.

The Life-saving Stations at Bantfield and Clayoquot were taken over on July 3, 1920.

On August 22 the motor ship *Pacific*, ashore at Beachy head, was brought off by the C.G.S. *Estevan*.

The American passenger and freight schooner *Dora* went ashore December 20 on Noble island and became a total wreck; no loss of life.

On December 3 the American fishing schooner *Malolo* went ashore on Flores island, off west coast of Vancouver island; abandoned, no loss of life.

The C.G. steamers *Estevan* and *Leebro* were employed in agency work throughout the season, the first from April 6, 1920, to March 18, 1921, and the second from March 26, 1920, to February 28, 1921.

## PRINCE RUPERT, B.C., AGENCY

The usual work of cleaning, painting, and repairing buoys and beacons, and maintaining light stations, and overhauling and installing fog-alarm plants was carried out in the district throughout the season.

The Government wharves at Stewart, Masset, and Spiller river were inspected and reports made on them.

The C.G.S. *Newington* was employed throughout the season in the district, except for the interval June 23 to August 17, when a strike occurred; the C.G.S. *Leebro* for a short time in September, and from January 26 to February 11, 1921; and the C.G.S. *Estevan* from June 14 to July 8.

## FORT WILLIAM, ONT., SUB-AGENCY

Ten lightkeepers went to their stations on April 21, 1920. The first vessel arrived on April 26, and all shore lights were in operation on April 29. Thirty-five spar buoys were placed in Port Arthur and Fort William harbours, and three bell buoys and two gas buoys.



12 GEORGE V, A. 1922

The C.G.S. *Grenville* arrived at Port Arthur August 1, left on August 4 with supplies for lake Superior stations. On September 25, C.G.S. *Bayfield* arrived at Port Arthur to install a new boiler.

The last vessel left for eastern ports on December 12, and on the same date all buoys were lifted.

#### KENORA, ONT., SUB-AGENCY

No new channels were buoyed during the season and only the buoy service already existing was maintained.

During the months of May and June the launch *Mist* and the ss. *Minaki* were employed on buoy service on lake of the Woods and Shoal lake. The *Mist* was employed on the same service during August on Rainy river and lake, and Wabigoon lake. On the Winnipeg river the steamer *Sport* was engaged from July 9 to 13 in painting and replacing buoys.

#### PARRY SOUND, ONT., AGENCY

A concrete boat runway was built in connection with Red Rock lighthouse in September, 1920, and repairs effected to boathouse and buildings at Bustard rocks station in the same month.

At the close of navigation and during the winter months of 1921 all the gas buoy lanterns in the district from Sarnia to the head of lake Superior, 51 in all, were overhauled. All gas and iron buoys in Georgian bay and part of lake Huron under the agency's control were put in condition for the opening of navigation.

The C.G.S. *Lambton* was employed in the district from April 8 to December 2, when she was laid up at Midland, and the C.G.S. *Grenville* from April 14 to December 25, wintering at Midland.

#### DOMINION LIGHTHOUSE DEPOT, PRESCOTT, ONT.

During the fiscal year 1920-21, lighthouse, fog alarm, and buoy materials were made up and shipped to the various agencies and light stations of the department, and the necessary work performed in the maintenance of lights, beacons, and gas buoys in the Prescott division.

During the winter extensive repairs were made to the C.G.S. *Concretia* and the C.G.S. *Scout*, and to the depot plant.

The machine shop completed about 166 orders during the year, and partially completed a number of others. These orders included the making of standard stock materials, remodelling of Alliance clocks, repairing of lens apparatus for shipment, repairs to materials received from various agencies, and necessary work for Government steamers and plants.

The carpenter shop kept all buildings at the Dominion Lighthouse Depot in proper repair, made necessary repairs to the decks and hulls of the Government steamers of the Prescott division, and made buoy superstructures and beacons.

The coppersmith and tinsmith shops repaired and improved all lanterns received from the various agencies and overhauled and made oil tanks, and also stove pipes for lighthouse supplies, and performed all coppersmith and tinsmith work in preparing apparatus in machine shop and carrying out repairs to Government steamers.

In the paint shop department all buoys and lighthouse lanterns of the Prescott division were painted, also fog alarm materials, lighting apparatus, superstructures, etc., as well as Government steamers.

Four hundred and sixty-eight shipments were sent out during the year by the packing and shipping department; boxes and crates made for all shipments, lists prepared, and all goods received, unpacked and stored.



## SESSIONAL PAPER No. 21

The blacksmith shop made all the forgings required by the machine shop during the year, necessary repairs to steamers, ladders, tools, and boats for lighthouse and fog alarms, and superstructures for gas and bell buoys.

The brass foundry turned out all brass castings required in various kinds of apparatus, vapour supplies, and for Government steamers.

Shipyard shop handled all freight shipments to and from the depot, as well as coal and store materials for the various departments, loaded and unloaded railway cars, and attended to the depot yard. A number of reclaimed spar buoys were overhauled, and some concrete anchors made.

The gas test room overhauled and tested all lighthouses, beacons, and buoy lanterns in the Prescott division. Carbide gaskets, purifier door gaskets, buoy lantern diaphragms, etc., for the agencies were made. Shipments of Pintsch gas to the Dominion Lighthouse Depot were measured up and reported on. Acetylene gas plants were installed at various stations.

Sixteen new patterns were turned out by the pattern shop, and a number overhauled and stored, and twenty-one drawings were made in the draughting room.

The C.G.S. *Scout* was employed in agency work from April 7 to December 14, 1920, and the C.G.S. *Concretia* from April 1 to December 15, 1920.

## MONTREAL AGENCY

The expenditure in the district exceeded that of 1919-20 by \$43,319.80.

Chambly basin front light was rebuilt, Cape Charles front light was moved to a new site, owing to the undermining of the old one, as also was Cap Madeleine upper back light.

At La Perade a new range light, concrete pier and concrete superstructure were built; a similar structure was erected at Gentilly to replace the old light moved out of position by ice shoves.

Piling and rip-rapping protection work was carried out at Isle de Grace back light and Ile Ste. Therese upper front light.

Lotbiniere front light was rebuilt to increase the visibility, a steel tower with wooden upper part, being supported by concrete pillars on a concrete platform.

Dominion steamers *Dollard*, *Reserve*, *Acetylene*, *Argenteuil*, *Vercheres*, *Shamrock* and *Varennnes* were employed at various periods during the season in the district.

## ST. JOHN, N.B., AGENCY

During the year all aids to navigation were inspected by the superintendent of lights, and all light and fog alarm stations, buoys and beacons repaired and kept in order.

Repairs were made to the life-saving stations at Bayview and Little Wood island at a cost of \$622 in all; repairs and alterations were also made to the Signal Service stations at Brier island, Parrsboro and Point Lepreau.

At the Partridge Island signal station, St. John, 74 steamers, tonnage 227,236, were signalled, and 10 sailing ships, tonnage 6,242; total 80 vessels, tonnage 237,910.

The following lights have been discontinued: Amherst Basin range lights, Annapolis wharf light, Clifton light, Porter Point light, Reid Point light, Salter Head light, and electric lights on west side of St. John harbour.

Repairs were made to wharves at Granville Centre, Digby, Little River, Ogilvie, St. John west, and St. Martins. Total wharfage collections amounted to \$74,158.62.

The new fog-alarm building at Letite passage with diaphone and oil-engines to replace the old steam trumpet was completed at a cost of \$7,337.95, and a day beacon erected at Matthews cove, Letite passage. At Machias, Seal island, the piers damaged



by seas were repaired and strengthened, and extensive repairs made to the dwelling house. An unwatched light was installed at Midjik bluff. A fog bell in a steel frame was erected on the end of the wharf at Spencer's island.

The installation of oil storage tanks are underway at Grindstone island, Long Eddy, Machias, Seal island and Cape Sharp.

The C.G.S. *Aberdeen* was employed in agency work throughout the season, except for the periods of June 4 to June 27, and December 8 to February 8, when she was undergoing repairs, during the first period at St. John, and the second at Halifax.

The C.G.S. *Laurentian* from April 1 to May 28 underwent repairs at the marine wharf at St. John; from May 29 to October 3, repairs to hull and machinery at Yarmouth, N.S.; from October 3 to March 31, 1921, was employed continuously in agency work.

#### PORT WARDENS' REPORTS FOR THE YEAR ENDED DECEMBER 31, 1920

Returns have been received from sixteen port wardens, eight from Nova Scotia port wardens, two from New Brunswick port wardens, two from Quebec port wardens, and four from British Columbia port wardens.

The total amount of fees collected by port wardens during the year was \$29,657.76. To this total the port of Montreal contributed \$17,142.91, the port of Halifax \$4,388.50, the port of Vancouver \$2,780.85, the port of Sydney, C.B., \$1,746, and the port of Quebec \$1,398.50.

The St. Lawrence ship channel was clear of ice on April 18, two days later than last year, the Government steamer *Lady Grey* being the first arrival. Navigation closed on December 6, with the departure of the ss. *Benguela* for South African ports.

At the port of Montreal the number of overseas ships reported during the year was 546, aggregate tonnage 1,896,439, an increase of 15 ships and 87,291 tons over last year.

For the lower ports 41 vessels cleared, 32 steam and 9 sailing ships, aggregate tonnage 22,783; this was a decrease of 56 ships and 138,484 tons as compared with last year, due largely to the lack of coal importation by the Dominion Coal Company.

For the first time since October 14, 1910, a full-rigged sailing ship, the *Grand Duchess Marie Nikolaevna*, of Odessa, 1,823 tons net, sailed from the port on October 2, with a cargo of lumber for Liverpool.

The water in the ship channel between Montreal and Quebec was unusually low during the season.

The following casualties occurred:—

August 14.—Collision between steamships *Tunisian* and *Manchester Division*, near Red island, in a dense fog; both damaged.

August 14.—SS. *Thomas Krag*, aground for fifteen minutes near White island light vessel, repaired at Quebec.

August 20.—SS. *Manon* touched bottom in Cap-a-la Roche channel; repaired at Quebec.

October 21.—SS. *Chama*, outward bound, stranded at Bellechasse; returned to port for repairs.

October 21.—SS. *Georgie*, grounded near Sillery; repaired at Quebec.



The amount of grain shipped from the port of Montreal during 1920 was:—

	Bushels
Wheat.. . . . .	42,708,589
Peas.. . . . .	41,694
Barley.. . . . .	5,039,309
Oats.. . . . .	2,761,258
Corn.. . . . .	431,055
Rye.. . . . .	6,536,296
Total.. . . . .	57,518,201

From the port of Halifax there was shipped during the year:—

Wheat.. .. .	782,284 bushels	to United Kingdom
Barley.. .. .	50,586 "	" "
Oats.. .. .	56,316 "	" "
Wheat.. .. .	129,480 "	Greece
<b>Total.. .. .</b>	<b>1,018,666</b>	

## NEW BOARD

On the resignation of the Hon. D. O. L'Espérance, as chairman of the board, a new board was appointed by order in council of April 21, 1920, consisting of Major-General Sir David Watson, Chairman, and Mr. A. S. Gravel, and Brigadier-General T. L. Tremblay, Commissioners.

## CHIEF ENGINEER'S REPORT

The second of the two fire-proof landing sheds at the St. Charles river quay front has been completed and is in use.

Railway lines to serve a coal site to the west of the river St. Charles quay front have been laid down.

The dredging of the St. Charles river basin was continued.

The level of pier No. 1 was raised and concrete paving laid down between the landing sheds and the quay front. Landing shed No. 26 was raised and repaired, and a second story erected over the south front to provide offices for the Canadian Pacific Railway Company.

A landing stage 300 feet by 51 feet and 13 feet above the quay level was built in connection with landing shed No. 18.

The paved roadway at the west end of embankment connecting with Ramsay street was completed.

A brick and concrete engine shed 119 feet by 60 feet was constructed under contract.

The upper part of the Custom House cribwork supporting the roadway leading to shed No. 21 was rebuilt.

Of the superstructure of the long wharf at Indian cove some 250 feet has been rebuilt, leaving 400 feet still to be done.

All commissioners' properties have been maintained in good order, with the exception of the roof of the older part of shed No. 18 which needs renewal.



12 GEORGE V, A. 1922

WHARFINGER'S REPORT

The traffic in connection with the St. Charles river docks and wharves was: inwards, 460 vessels, 1,121,637 tons register; outwards, 214 vessels, 549,946 tons register; lower port vessels, inwards, 98 vessels, 14,674 tons register; outwards, 105 vessels, 18,610 tons register.

HARBOUR MASTER'S REPORT

Port of Quebec—Record of Shipping Arrivals, 1920

	No.	Gross tons
Coasting vessels from seawards.. . . . .	199	129,829
Coasting vessels from Montreal and Great Lakes.. . .	251	255,999
Ocean steamships, inwards.. . . . .	156	1,405,452
Ocean steamships, outwards.. . . . .	104	438,855
Totals.. . . . .	710	2,230,135

The outer Louise basin was kept open for navigation until January 15 when all vessels went into winter quarters.

The C.G.S. *Lady Grey* was the only steamer in commission throughout the winter. On March 6, fire broke out on ss. *Marian W* in the inner Louise basin, the vessel was burnt to the water's edge.

The first coastwise ship to arrive in port in the spring was the schooner *Sault au Mouton*, on April 1, and the first overseas ship the *Canadian Aviator*, on April 24.

First mail and passenger steamer to arrive was the *Saturnia*, Donaldson Line, on May 3.

The last vessels to depart were the ss. *Keyingham* and *Lake Gatum*, on December 12. On December 13 all ships, except some of the Government steamers went into winter quarters in the outer Louise basin.

TRAFFIC MANAGER'S REPORT

Loaded cars received.. . . . .	13,423	
Loaded cars forwarded.. . . . .	11,011	
		24,434
Empty cars received.. . . . .	6,071	
Empty cars forwarded.. . . . .	8,581	
		14,652
Total number cars handled.....		39,086

Cars handled by "Car Ferry" Account Grand Trunk Railway System—

Loaded cars received.. . . . .	4,569
Loaded cars forwarded.. . . . .	2,821
Empty cars received.. . . . .	538
Empty cars forwarded.. . . . .	1,267
	9,195

Account Quebec Central Railway—

Loaded cars received.. . . . .	439
Loaded cars forwarded.. . . . .	692
Empty cars received.. . . . .	9
Empty cars forwarded .. . . . .	53
	1,193

Total number of cars handled by "Car Ferry".. . . . .	10,388
Loaded cars interchanged via harbour tracks.. . . . .	3,256
Loaded passenger, mail and baggage cars handled.. . . .	3,109
Number of cars of coal forwarded from Harbour tracks.. .	1,401



## SESSIONAL PAPER No. 21

## GRAIN ELEVATOR NO. 2

Grain received—		Bushels
In store at end of season 1919.. . . . .		433,664
Grain received during year.. . . . .		450,786
Total.. . . . .		884,450
Grain delivered—		Bushels
By conveyors.. . . . .		111,152
" cars.. . . . .		410,511
" bags.. . . . .		217,517
		739,180
In store January 1, 1921.. . . . .		145,270

## REVENUE AND EXPENDITURE

The revenue for 1920 was \$322,397.47, the expenditure \$387,619.43, leaving a deficit for the year of \$65,221.96.

## GENERAL

A movement has been set on foot to induce the different Canadian railway companies to restore on grain sent to Quebec for export, the old rates in effect during the years 1900 to 1903 inclusive, in order to bring to Quebec large quantities of grain for shipment, at present being shipped from American ports, owing to the high freight rates at present prevailing on Canadian lines.

The matter is now before the Board of Railway Commissioners.

During 1920 the commissioners' wharfage and switching tariffs were carefully revised with a view to meeting the increased costs of material and labour.

The operating and office staff have been reduced to a minimum, and every precaution taken against waste of any kind; as a result the operating expenditure for 1920 was \$387,619.43, as compared with \$438,673.17 for 1919, a decrease of \$51,053.74.

The chairman of the Quebec Harbour Commission, accompanied by Brigadier T. L. Tremblay, Commissioner, and the secretary-treasurer of the commission, attended the sitting of the 9th Annual Convention of the American Association of Port Authorities held at Chicago on September 30, 1920, when various papers relating to United States and Canadian ports, their development and equipment, were read and discussed. The chairman of the Quebec Harbour Commission was elected one of the vice-presidents of the association.

## THREE RIVERS HARBOUR COMMISSION

## STATEMENT of Number and Tonnage of Steamers and other Vessels Reported Inward and Outward of the Port of Three Rivers, for the Year 1920

Ocean Traffic Nationality	Return of Vessels Inward		Ocean Traffic Cleared for	Return of Vessels Outward	
	No.	Tons		No.	Tons
British.....	13	50,105	Inland ports .....	4	5,339
American.....	1	1,257	Great Britain .....	16	47,250
Dutch.....	1	1,227			
	20	52,589		20	52,589
United States Traffic			Inland Traffic		
Canal Boats.....	173	17,361	Tugs—Steamboats—Barges .....	763	900,092



12 GEORGE V, A. 1922

RECAPITULATION

Ocean traffic.. . . . .	20	52,589
United States traffic.. . . . .	173	17,361
Inland traffic.. . . . .	768	900,092
Grand total.. . . . .	961	970,042

MERCHANDISE

Inward		Outward	
Hard coal.. . . . .tons	12,963	Sand.. . . . .tons	42,500
Soft coal.. . . . ."	2,300	Paper.. . . . ."	8,895
Sand.. . . . ."	1,443	Pulpwood.. . . . .cords	5,823
Sulphur.. . . . ."	19,505	Lumber.. . . . .feet	20,838,177
Mash hay.. . . . ."	148		
Fuel oil.. . . . .Imp. gal.	1,256,005		
Cordwood.. . . . .cord	320		
Bricks.. . . . .	1,470,000		
Apples.. . . . .bushels	1,350		
Lumber.. . . . .feet	520,875		

RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1920

Receipts		Disbursements	
Tonnage dues.. . . . .	\$ 1,410 79	Current expenses.. . . . .	\$ 348 47
Moorage dues.. . . . .	485 19	Salaries and commission.. . . . .	5,840 65
Harbour dues: Inward.. . . . .	3,536 14	Printing and stationery.. . . . .	101 66
Harbour dues: Outward.. . . . .	3,005 14	Travelling.. . . . .	17 95
Commutation.. . . . .	680 50	Repairs and general harbour ex-	
Rent of wharves.. . . . .	5,888 47	penses.. . . . .	2,535 70
Divers and discounts.. . . . .	7,852 00	Interest on debentures.. . . . .	9,537 50
Similarly amounts and notes to be		Construction.. . . . .	112 47
collected.. . . . .	2,659 45	Divers repayments .. . . . .	3,226 79
Reserve account.. . . . .	23 71		
	\$25,541 39	Outstanding account.. . . . .	2,659 45
Deposit in bank and cash on hand		Deposit in bank and cash on hand	
December 31, 1919 .. . . . .	2,460 27	December 31, 1920.. . . . .	3,621 02
	\$28,001 66		\$28,001 66

VANCOUVER HARBOUR COMMISSION

DESCRIPTION OF HARBOUR .

The limits of Vancouver harbour as described by the Dominion Act of Parliament of 1913, extend eastward to a line drawn from Point Atkinson lighthouse and the westernmost part of point Grey on English bay, and include the tidal waters of English bay, Burrard inlet, with the North arm and Port Moody, and False creek.

WHARVES, PIERS AND SHEDS IN USE

	Length feet	Width feet	Approximate capacity of sheds in tons
Dominion Government wharf .. . . . .	800	300	.....
Shed 1.. . . . .	678	80	5,400
Shed 2.. . . . .	843	98	8,250
Canadian Pacific Railway Wharf Line, 8,252 Feet—			
Pier "A" Sheds 1, 2, 3.. . . . .	700	184	8,250
Pier "D" .. . . . .	942	150	6,400
Pier "H" (open storage).. . . . .	700	120	8,400
Shed.. . . . .	620	90	5,600
Key wharves from piers "A" to "H".. . .	1,600	100	12,500
Shed 3.. . . . .	300	80	
Sheds 4, 5, 6, 7.. . . . .	1,150	80	



SESSIONAL PAPER No. 21

WHARVES, PIERS AND SHEDS IN USE—*Concluded*

	Length feet	Width feet	Approximate capacity of sheds in tons
Great Northern Railway. . . . .	470	127	.....
Two sheds.. . . .	600	100	6,000
	400	.....	4,000
Grand Trunk Steamship Co.. . . . .	550	100	.....
One shed.. . . .	500	70	3,300
Union Steamship Co.. . . . .	435	95	4,100
Evans, Coleman & Evans—			
Pier No. 1.. . . .	600	91 }	
Shed.. . . .	590	62 }	3,700
Pier No. 2.. . . .	732	100 }	
Shed.. . . .	632	75 }	4,800
Imperial Oil Co. at Ioco—			
Two wharves.. . . .	850	.....	.....
With two L's.. . . .	300	.....	.....
Tank storage capacity.. . . .	.....	.....	133,300
Union Oil Co.. . . . .	300	20	.....
Four tanks, each 55,000 bbls. capacity.. . .	.....	..... }	
One feed tank, 1,000 brl. capacity.. . .	.....	..... }	30,000

PIERS UNDER CONSTRUCTION

Ballantyne Pier, Vancouver Harbour Com- missioners.. . . .	1,200	341	40,000
(Double-decked sheds, reinforced concrete throughout).			
Canadian Pacific Railway—			
Pier "B" "C".. . . .	1,100	330	30,000
Double-deck sheds.			

RAILWAYS

The Canadian transcontinental railways entering Vancouver are the Canadian Pacific, Canadian National and Grand Trunk Pacific, while the American railways doing business at the port are the Great Northern, Northern Pacific, and the Chicago, Milwaukee and St. Paul.

OVERSEAS STEAMSHIP COMPANIES

The bulk of the deep-sea shipping from the port during 1920 was handled by the companies given below:—

- Blue Funnel (Dodwell & Co.).
- Canadian-Australasian Royal Mail Line.
- Canadian Government Merchant Marine, Ltd.
- Canadian Pacific Ocean Services, Ltd.
- Canadian Robert Dollar Company, Ltd.
- Canadian Western Steamship Company.
- Frank Waterhouse & Co.
- Harrison Line (Balfour Guthrie).
- Isthmian Line (B. W. Greer & Co.).
- Johnson Line (C. Gardner Johnson Company).
- Kingsley Navigation Company.
- Nippon Yusen Kaisha (B. W. Greer & Co.).
- Norwegian Line.
- Osaka Shosen Kaisha (C. Gardner Johnson Company).
- Pacific Coast Steamship Company (Admiral Line).
- Pacific Mediterranean (B. W. Greer & Co.).
- Pacific Motorship Line.
- Rolph Line.
- Royal Mail Steamship and Holland-American (joint service).
- Struthers & Dixon (John Galt).



COASTWISE SHIPPING COMPANIES

Among the companies carrying on passenger and freight business in British Columbia waters are:—

- British Columbia Coast Steamship Service (Canadian Pacific Railway Co.).
- Coast Steamship Company.
- Coastwise Steamship and Barge Company.
- Frank Waterhouse & Company.
- Grand Trunk Pacific Coast Steamships.
- Kingsley Navigation Company.
- Union Steamship Company.

GRAIN ELEVATOR

The Dominion Government grain elevator situated on the Government wharf is a model of modern elevator construction. It has a storing capacity of 1,250,000 bushels, a receiving capacity of 20,000 bushels per hour, a loading capacity of 60,000 bushels per hour, and a sacking plant with a capacity of 3,000 to 5,000 bushels per hour.

SHIPBUILDING

The shipyard of J. Coughlan & Sons, Ltd., on False creek, has equipment for building ships of 8,000 tons and over, and has received orders not only from Britain and Canada, but from a number of foreign countries, including France, Spain, Norway, Sweden, Belgium, Greece, and Italy.

The Wallace Shipbuilding and Drydock Company, Ltd., constructs ships of all sizes from tug-boats to ocean freighters. This company has also a marine way and repairing plant with a capacity up to 2,500 tons d.w.

RECORD OF SHIPPING FOR YEAR ENDED DECEMBER 31, 1920

COASTWISE	
Number of vessels (local) .. .. .	11,240
Number of vessels (foreign) .. .. .	249
Total gross tonnage (local and foreign) .. .. .	7,397,472
Number of passengers landed .. .. .	300,481
Number of passengers shipped .. .. .	293,624
DEEP SEA	
Number of vessels .. .. .	336
Total gross tonnage .. .. .	1,884,042
Number of passengers landed .. .. .	31,418
Number of passengers shipped .. .. .	18,882
OPERATING REVENUE	
Harbour dues—Port Warden fees, etc. .. .. .	\$ 56,668 24
Cargo rates .. .. .	56,315 48
Government wharf, including rental of wharf due from C.G.M.M. Limited .. .. .	60,600 30
Granville Island—Rental revenue .. .. .	32,081 20
Rentals of water lots .. .. .	15,759 92
	<hr/>
	\$221,425 14
OPERATING EXPENDITURE	
Government wharf—Maintenance and repairs .. .. .	\$ 20,896 28
Granville Island—Operating expenses and maintenance .. .. .	11,886 80
Interest and exchange on debentures to the public .. .. .	16,659 40
Sundry expenses on harbour, etc. .. .. .	8,736 83
Administration and miscellaneous expenses .. .. .	74,534 69
	<hr/>
Total operating expenditures .. .. .	\$132,714 00
Surplus for year ended December 31, 1920 .. .. .	88,711 14
	<hr/>
	\$221,425 14



## SESSIONAL PAPER No. 21

## PICTOU HARBOUR COMMISSION

## STATEMENT OF HARBOUR DUES FOR THE YEAR ENDED DECEMBER 31, 1920

Balance on hand December 31, 1919.. . . .	\$100 00	
Collections of harbour dues in 1920.. . . .	604 27	
		<hr/>
		\$704 27

## DISBURSEMENTS IN 1920

Paid salary of Harbour Master.. . . .	\$200 00	
Paid Harbour Commissioners.. . . .	404 27	
Cash balance on hand.. . . .	100 00	
		<hr/>
		\$704 27

## COMMISSIONERS' ACCOUNT FOR THE YEAR ENDED DECEMBER 31, 1920

1920

April 13—Wm. McLean, bushing channel to old Loading Ground	\$ 18 00	
23—E. C. McDonald, bushing East River . . . . .	31 50	
S.S. <i>Hiawatha</i> , putting out harbour buoys.. . . .	40 00	
May 19—Wm. Talbot, putting 5 mooring posts New Glasgow wharf.. . . .	100 00	
P. Hall, painting buoys.. . . .	12 00	
R. Powell, saving buoy adrift and placing same in position.. . . .	27 50	
Albert McDonald, placing buoy over sunken wreck, East river.. . . .	6 00	
Alex. McMillan, chain for buoy.. . . .	20 70	
John Doull, solicitor.. . . .	10 00	
S.S. <i>Hiawatha</i> , taking up buoys.. . . .	30 00	
E. C. McDonald, extra bushing East river.. . . .	10 00	
Sumner Gordon marks channel.. . . .	45 00	
J. W. McKinnon, balance.. . . .	100 00	
Secretary, salary.. . . .	200 00	
Balance.. . . .	33 82	

1920

Feb. 11—Balance per acct.. . . .	\$280 25	
----------------------------------	----------	--

1921

Jan. 7—Harbour dues, 1920, per statement Collector Customs.. . . .	404 27	
	<hr/>	
	\$684 52	\$684 52
	<hr/>	
By balance.. . . .	\$33 82	
	<hr/>	

## MONTREAL HARBOUR COMMISSION

## PERSONNEL

The 1920 personnel of the Harbour Commission is exactly the same as last year's, namely: President, W. G. Ross; Commissioners, Farquhar Robertson, A. E. Labelle; Officials: Secretary-treasurer, M. P. Fennell, jr.; Cashier, Thomas F. Triley; Chief Engineer, F. W. Cowie, M.I.C.E., Am.Soc.C.E.; Consulting Engineer, Sir John Kennedy; Assistant Chief Engineer, T. W. Harvie; General Superintendent of Grain Elevators, M. Peterson; Mechanical Superintendent, George Gendron; Harbour Master, Captain T. Bourassa; Deputy Harbour Master, Captain J. P. Symons; Comptroller, George E. Smart; Paymaster and Wharfinger, R. A. Eakin; Superintendent of Railway Terminals, J. Vaughan; Assistant Superintendent of Railway Terminals, R. L. Mercier; Purchasing Agent, L. H. A. Archambault; Supervisor Customs Wharfages, P. E. Morant; Chief of Police, Lieut.-Colonel E. A. Williams.



PORT DEVELOPMENT AIMS

In the development of the port of Montreal special attention has been devoted to:—

- 1. Concentration of self-contained comprehensive units.
- 2. Capacity use of facilities.
- 3. Close connection between all railways and ships.
- 4. Prompt release of cars.
- 5. Port charges at a minimum.
- 6. Location with reference to centre of city and business.

The Montreal Harbour Commission since its inception has been singularly fortunate in its personnel.

At its head have been capable, successful, and public-spirited business men, with no private interests to serve, and in the course of sixty-five years there have been only three engineers-in-chief and four secretary-treasurers. To the disinterested efforts of the board and the efficient services of the official staff throughout this period, the present proud position of Montreal as the world's sixth greatest port is largely due.

ACCOMMODATION

At a total cost of \$31,000,000, Montreal harbour has at present accommodation as follows:—

One hundred steamship berths from 350 to 750 feet in length, with a depth of water of 20 to 35 feet.

Thirty-five of these steamship berths are at modern concrete wharves, built in the past few years.

Two large modern fireproof elevators with conveyor system to eighteen steamship berths, at which nine vessels can be loaded with grain at one time.

Twenty-four permanent fireproof transit sheds.

Fifty-eight miles of harbour railway tracks.

Complete and valuable construction and repair plants.

About 200 acres of land situated in the most valuable position, industrially, in Montreal, all reclaimed.

The extent of the wharves and piers at the end of the season is as follows:—

For 30-ft. draft and over at O.L.W.. . . . .	26,676 lin. ft.
or 5.0522 miles.	
For 25 to 27½ ft.. . . .	13,442 " "
or 2.5458 miles.	
Total deep draft.. . . .	40,118 " "
or 7.5981 miles.	
Included in this, five berths are available having a depth of 35 feet at O.L.W.	
For 20-ft. draft and under.. . . .	3,105 " "
or 0.5880 miles.	
Total wharfage, end of 1920.. . . .	43,223 " "
or 8.1861 miles.	

ENGINEERING DEPARTMENT

*Public Warehouse and Cold Storage Plant*

All the piling work for the new public warehouse and cold storage plant having been completed in 1919, construction work was begun in 1920, and carried out during the season. The whole structure up to the main roof was completed, mass concrete foundations for the larger machinery units being formed on the foundation slab and carried up to the level of the first floor.

The structural steel framing of the cupola was erected and partly rivetted.



## SESSIONAL PAPER No. 21

All work, save the brick and terra cotta work, which it was thought could be done to better advantage by sub-contract, was carried out by the Commission under the direction of the Chief Engineer.

Contracts were let for several tanks required for equipment, and also for three 14-ton overhead travelling cranes.

It is hoped that the entire structure, both cold storage warehouse and powerhouse, will be completed and operated early in 1922.

*High Level Railway Widening, Sections 27 to 30*

Additional tracks were extended over Jail Ramp subway, terminating in a ladder track about 700 feet east of the subway. Additional tracks laid amounted to 1,500 lineal feet; this work included the extension of the concrete abutments of the Jail Ramp subway for about 31 feet, and the erection of two new steel bridges on the subway.

*Victoria Pier Tracks*

The rearrangement of the original track was proceeded with in connection with the completion of sheds Nos. 17, 18 and 19. The work resulted in a net reduction of 3,377 lineal feet of track. The surface drainage work was completed, embracing the laying of 220 lineal yards of tile pipe and the construction of seven cesspools.

*New Wharves, etc.*

For the extension of shore wharves on section 30 an additional length of crib-work substructure of 280 feet was put down, and the concrete superstructure of standard high level section was completed to height of 108 H.D., completing an additional low level berthage of 280 lineal feet capable of future elevation to standard high level.

A large section of wharf area was reclaimed.

In the fall work was done on Jacques Cartier pier.

On the east face the sheet piling of the substructure was completed, 2,256 lineal feet being driven, and on the west face 4,992 lineal feet were driven. The piles have shoes of steel and were driven to refusal, presumably on bed-rock.

The westmost large slipway in the shore wharf of Market basin was enlarged from 44 feet to 51 feet 6 inches to accommodate the larger river steamers of the Canada Steamship Lines, at whose expense the work was done.

Three additional slipways were built in the Sutherland pier, two at the end, and one on the east side, for the accommodation of the ferry steamers *Boucherville* and *Imperial*. This work was also done at the expense of the owners.

## DREDGING AND FILLING

No. 8 derrick was the only unit of the dredging fleet to complete a full season's work, and was used almost exclusively for discharging ships' ballast. No. 6 dredge went into commission on August 4, and for two months was engaged in maintenance work, and for the rest of the season on the Bickerdike pier extension.

The total dredging amounted to 114,300 cubic yards. Rock filling to 34,300 cubic yards.

## SAW-MILL

The saw-mill worked from February 24 until July 3, when it was burned down. The total amount sawn was 371,075 feet b.m., the total amount planed 137,721 feet b.m. The total amount of timber and lumber delivered to the works during the season was 606,532 feet b.m.



12 GEORGE V, A. 1922

## HARBOUR RAILWAY TERMINALS

The interchange traffic on the harbour system showed an increase of 40 per cent over last year, averaging, for the entire year, more than 1,000 cars a month.

An unusual feature of the traffic operations during the season of navigation was a heavy movement of traffic during the months of July and August.

Although the car handling decreased from 182,328 cars in 1919 to 174,181 cars in 1920, the season of navigation shows an increase of 4,129 cars over the season of 1919.

The work of electrifying the terminals was carried out throughout the year, and the main lines as far as section 39 are now practically completed.

The new machine shop adjoining the engine-house was completed and taken over by this department in the early summer.

## GRAIN ELEVATOR SYSTEM

Grain handled by elevator No. 1, capacity 4,000,000 bushels, amounted to 22,783,646 bushels as follows: by water, 10,424,037 bushels, from 168 steamers and 64 barges; by cars, 12,359,609 bushels, unloaded from 8,496 cars.

Grain handled by elevator No. 2, capacity 2,662,000 bushels, amounted to 21,651,458 bushels as follows: by water, 748,046 bushels, from 10 steamers and 7 barges; by cars, 20,903,046 bushels unloaded from 13,670 cars.

The total amount of grain handled during 1920 was 44,435,104 bushels; in 1919, 35,509,323 bushels.

## POLICE DEPARTMENT

During the season of 1920 the harbour police force comprised 4 officers and 80 men, all uniformed and armed. They regulated the traffic on the wharves, kept order, and protected life and property within the harbour limits, and were at the disposal of the various shipping companies during the summer.

During the season of 1920, 66 ocean liners docked, bringing 21,539 passengers, and the same number sailed with 54,046 passengers, making a total of 75,585 ocean passengers handled during the season.

## FINANCIAL STATEMENT

Receipts on revenue account were \$2,434,773.72. The cost of operation, maintenance, sinking fund, etc., was \$2,396,308.10, leaving a surplus to the credit of revenue account for the year of \$38,465.62. The interest charges, which amounted to \$965,920.10, show an increase of \$54,599.61 on new loans due to the carrying out of the works of improvement.

The disbursements on capital account in 1920 amounted to \$1,755,266.27.

The debenture debt of the corporation on December 31, 1920, was \$28,967,000, of which \$28,230,000 is due to the Government and \$737,000 to the public.

## SHIPPING

During 1920, 663 ocean ships arrived in port, tonnage 2,031,729, as against 786 ships in 1919, tonnage 2,179,280.

## GENERAL

On an average 1,060 men were employed by the commission during the season of 1920.

During the season a number of distinguished visitors inspected the harbour, including members of the National Association of the Manufacturers of the United States, and members of the New Jersey Port Development Commission.



## SESSIONAL PAPER No. 21

## REPORT OF THE QUEBEC SALVAGE AND WRECKING CO., LTD.

1920

May 10—SS. *Empress of France*—Diver examined propeller.

May 13—British steamer *Atikokan*, grounded Madame reef. Refloated herself; ss. *Lord Strathcona* convoyed her to Quebec.

May 15 to July 26—C.G.M.M. steamer *Canadian Recruit* stranded off Tadoussac. Assisted with gear, our schooner, *G. T. D.* and ss. *Lord Strathcona* in refloating this steamer and brought her to Quebec.

May 25 and 26—C.G.M.M. steamer *Canadian Hunter*.—The ss. *Lord Strathcona* towed her from Quebec to Three Rivers.

June 7 and 8.—British steamer *Manchester Division* grounded off St. Charles river, Quebec. The ss. *Lord Strathcona* refloated her.

August 11 to August 22.—C.G.M.M. *Canadian Recruit*.—Rented pumps in order to enable contractor to take ship from Quebec to Montreal.

August 21 to 23.—British steamer *Manchester Corporation*. Made temporary repairs to bottom of ship after touching bottom in Louise basin, Quebec.

August 27 to 30.—C.G.M.M. steamer *J. A. McKee* ashore Prince's shoal. Rendered assistance, refloated her and brought her to Quebec.

September 13 and 14.—C.P.R. steamer *Metagama*. Aground Ile Bouchard; went to her assistance and together with other tugs refloated her.

September 25.—British steamer *Villavia*. This steamer touched bottom on her way from Montreal to Quebec; rendered diver's examination of entire bottom in the harbour of Quebec.

October 4.—C.P.O.S. steamer *Empress of France*. This steamer sustained damage while laying alongside breakwater, Quebec; our diver and wreckers rendered assistance in connection with temporary repairs.

October 5 to 8.—SS. *Lord Strathcona* towed dredge and four scows from Port Alfred, Saguenay to Quebec.

October 21 to 26.—British steamer *Chama*. This steamer went ashore on Bellechasse island and was in a very dangerous position; we salved her and brought her via Quebec to Montreal.

November 19 to December 6.—U.S. steamer *South American*. This steamer drifted ashore off Little Capes, off Gaspé coast; we refloated her and towed and convoyed her to Halifax.

The ss. *Lord Strathcona*, schooner *G.T.D.*, properly manned with all salvage gear, in good order, have been kept in commission during the season of navigation to proceed to any accidents or mishaps to ships at very short notice.

## REPORT OF PACIFIC SALVAGE COMPANY, LIMITED

## SALVAGE OPERATIONS FOR THE YEAR ENDING MARCH 31, 1921

April 1 to April 17, 1920.—*Prince John* struck at Dead Tree point, Queen Charlotte islands..

September 29 to December 27, 1920.—*Prince Rupert* ashore at Swanson bay, B.C. (submerged).

February 10 to February 13, 1921.—*Princess Beatrice* struck at Steep island, B.C.



12 GEORGE V, A. 1922

RETURNS OF SHIPPING MASTERS FOR THE YEAR ENDING  
DECEMBER 31, 1920

NOTE.—The collector of customs acts as shipping master where no shipping master  
• is appointed.

QUEBEC

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen discharged	Amount
Chandler .....	Gaspé .....	.....	.....	.....	.....
Escoumains .....	Saguenay .....	.....	.....	.....	.....
Gaspé .....	Gaspé .....	.....	.....	.....	.....
Grand Pabos .....	Gaspé .....	.....	.....	.....	.....
Montreal .....	Hochelaga .....	J. O. Grey.....	6,272	6,246	5,587 60
Magdalen Islands .....	Gaspé .....	C. F. Painchaud....	Nil	Nil	Nil
Paspébiac .....	Bonaventure .....	E. W. LeGallais..	13	7	8 60
Perceé .....	Gaspé .....	Phil. LaBoutellier..	Nil	Nil	Nil
Quebec .....	Quebec .....	T. Beland .....	844	301	497 20
Rimouski .....	Rimouski .....	.....	.....	.....	.....
St. John's .....	St. John's .....	.....	.....	.....	.....
Three Rivers .....	St. Maurice .....	W. D. Fisher.....	12	10	9 00
			7,141	6,564	6,102 40

NEW BRUNSWICK

Albert .....	Albert .....	.....	.....	.....	.....
Alma .....	Albert .....	.....	.....	.....	.....
Bas de Verre .....	Westmorland.....	.....	.....	.....	.....
Bathurst .....	Gloucester.....	C. J. Melanson .....	15	13	11 40
Chatham .....	Northumberland...	R. J. Walls.....	39	43	32 40
Dalhousie .....	Restigouche .....	.....	.....	.....	.....
Dorchester .....	Westmorland .....	.....	.....	.....	.....
Fredericton .....	Westmorland .....	.....	.....	.....	.....
Grand Harbour .....	Charlotte .....	.....	.....	.....	.....
Harvey .....	Albert .....	.....	.....	.....	.....
Hillsborough .....	Albert .....	.....	.....	.....	.....
Lepreau .....	Charlotte .....	J. E. Haggerty .....	Nil.	Nil	Nil
Musquash .....	St. John .....	.....	.....	.....	.....
New Brunswick .....	Gloucester .....	.....	.....	.....	.....
Newcastle .....	Northumberland.....	.....	.....	.....	.....
Quico .....	St. John .....	.....	.....	.....	.....
Riverside .....	Albert .....	.....	.....	.....	.....
Rockport .....	Westmorland.....	.....	.....	.....	.....
Sackville .....	Westmorland.....	.....	.....	.....	.....
St. Andrews .....	Charlotte .....	.....	.....	.....	.....
St. George .....	Charlotte .....	Geo. A. Craig.....	15	14	11 70
St. John .....	St. John .....	W. H. Purdy.....	1,616	1,357	1,215 10
St. Martins .....	St. John .....	R. Allan Love .....	30	13	18 90
St. Stephen .....	Charlotte.....	Andrew McWha .....	Nil	Nil	25 00
Shediac .....	Westmorland .....	.....	.....	.....	.....
Stapleton .....	Gloucester .....	.....	.....	.....	.....
			1,715	1,440	1,314 50

\*54 Lighters and Sardine Boats.

NOVA SCOTIA

Advocate Harbour .....	Cumberland .....	E. C. Moore.....	3	1	1 80
Anchor .....	Cumberland .....	.....	.....	.....	.....
Annapolis Royal .....	Annapolis .....	.....	.....	.....	.....
Antigonish .....	Antigonish .....	.....	.....	.....	.....
Apple River .....	Cumberland.....	.....	.....	.....	.....
Arichat .....	Richmond .....	Chas. V. Herbin....	3	1	1 80
Baldock .....	Victoria .....	.....	.....	.....	.....
Barrington .....	Shelburne .....	.....	.....	.....	.....
Barton .....	Digby .....	F. W. Hutchinson...	10	Nil	5 00
Battle Hill .....	Antigonish .....	.....	.....	.....	.....
B. Haven Cove .....	Digby .....	E. E. Theriault .....	8	4	5 20
Beaver River .....	Digby .....	.....	.....	.....	.....
Braceville .....	Lunenburg .....	.....	.....	.....	.....
Charlottetown .....	Kings .....	J. W. Miller .....	9	6	6 30
Chatham .....	Guysborough .....	P. C. Cullen .....	38	11	22 30
Chatham Port .....	Digby .....	.....	.....	.....	.....
Clark Harbour.....	Shelburne .....	.....	.....	.....	.....
Clementville .....	Annapolis .....	M. C. Jones .....	16	20	14 00
Colebrook .....	Hants .....	Nelson Brady .....	11	7	7 60
Dartmouth .....	Richmond .....	.....	.....	.....	.....
Dartmouth .....	Digby .....	.....	.....	.....	.....
Grand Bay .....	Cape Breton.....	.....	.....	.....	.....
Great Village .....	Colchester.....	.....	.....	.....	.....
Guysborough .....	Guysborough .....	.....	.....	.....	.....
Halifax .....	Inverness.....	.....	.....	.....	.....



## SESSIONAL PAPER No. 21

RETURN OF SHIPPING MASTERS—*Continued*

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen discharged	Amount
Halifax.....	Halifax.....	H. S. Drake.....	4,296	3,321	3,144 30
Hastings.....	Inverness.....				
Hantsport.....	Hants.....	J. W. Lawrence.....	8	7	6 10
Havre Bouche.....	Antigonish.....				
Isaac Harbour.....	Guysborough.....				
Jordan Bay.....	Shelburne.....	E. Lyle Martin.....	Nil	Nil	Nil
Lahave.....	Lunenburg.....	E. M. Reinhardt.....	161	198	139 90
Liscomb.....	Guysborough.....	Wm. Hemlow.....	13	8	8 90
Liverpool.....	Queens.....	W. A. Smith.....	32	11	19 30
Lockeport.....	Shelburne.....	J. R. Ruggles.....	1	Nil	0 50
Louisburg.....	Cape Breton.....	A. M. Townsend.....	214	221	173 30
Londonderry.....	Colchester.....				
**Lunenburg.....	Lunenburg.....	William Shupe.....	412	446	584 80
†Mahone Bay.....	Lunenburg.....	T. F. Mader.....	27	16	35 80
Mainadieu.....	Cape Breton.....	A. McDougall.....	Nil	Nil	Nil
Maitland.....	Hants.....				
Margaretsville.....	Annapolis.....				
Margaree.....	Inverness.....				
Merigomish.....	Pictou.....				
Meteghan.....	Digby.....	L. T. Melanson.....	5	11	5 80
New Campbellton.....	Victoria.....				
North East Harbour.....	Shelburne.....	G. B. Swaine.....	Nil	Nil	Nil
North Sydney.....	Cape Breton.....	M. J. Ross.....	571	490	432 50
Parrsboro.....	Cumberland.....	E. Woodworth.....	212	161	154 30
Pictou.....	Pictou.....				
Port Greville.....	Cumberland.....	F. R. Canning.....	69	59	52 20
Port Hawkesbury.....	Inverness.....				
Port Hastings.....	Inverness.....	Geo. L. McLean.....	9	2	5 10
Port Hood.....	Inverness.....				
Port Latour.....	Shelburne.....	Benj. R. Smith.....	Nil	Nil	Nil
Port Lorne.....	Inverness.....				
Port Medway.....	Queens.....				
Port Morien.....	Cape Breton.....				
Port Mulgrave.....	Guysborough.....				
Port Wade.....	Annapolis.....				
Port Williams.....	Kings.....				
Pubnico.....	Yarmouth.....	J. L. Belliveau.....	3	Nil	1 50
Pugwash.....	Cumberland.....				
River Hebert.....	Cumberland.....	J. F. Moffat.....	1	Nil	0 50
Riverport.....	Lunenburg.....	E. Wentzell.....	34	29	25 70
St. Anns.....	Victoria.....				
St. Peters.....	Richmond.....				
Salmon River.....	Digby.....				
Sheet Harbour.....	Halifax.....				
Shelburne.....	Shelburne.....	A. C. Bruce.....	32	21	22 30
Sherbrooke.....	Guysborough.....				
Spencers Island.....	Cumberland.....	Geo. D. Spicer.....	12	2	6 60
Sydney.....	Cape Breton.....	V. Mullins (Acting)	553	563	445 40
Thorne Cove.....	Annapolis.....				
Truro.....	Colchester.....				
Tatamagouche.....	Colchester.....	J. Ramsay.....	Nil	Nil	Nil
Wallace.....	Cumberland.....	A. D. Macfarlane.....	4	2	2 60
Walton.....	Hants.....				
West Arichat.....	Richmond.....				
Weymouth.....	Digby.....				
Windsor.....	Hants.....				
Wolfville.....	Kings.....				
Yarmouth.....	Yarmouth.....	S. Harding (Acting)	250	165	174 50
			7,017	5,783	5,505 90

\*\*Shipped 60 fishing crews—2 beam trawlers.

†Seven fishing crews at \$2.50—\$17.50.

## PRINCE EDWARD ISLAND

Alberton.....	Prince.....				
Charlottetown.....	Queens.....	F. Beers.....	58	30	38 00
Crapaud.....	Queens.....	Neil Waddell.....	3	Nil	0 90
Georgetown.....	Kings.....				
Malpeque.....	Prince.....	R. J. Crafer.....	Nil	Nil	Nil
Murray Harbour.....	Kings.....				
Montague.....	Kings.....				
Pinette.....	Queens.....				
Port Hill.....	Prince.....				
St. Peters.....	Kings.....				
Souris.....	Kings.....				
Summerside.....	Prince.....				
Tignish.....	Prince.....				
			61	30	38 90



12 GEORGE V, A. 1922

RETURN OF SHIPPING MASTERS—*Concluded*

## BRITISH COLUMBIA

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen discharged	Amount
Aboucet.....	Vancouver.....				
Clayoquot.....	Comox-Atlin.....				
Hesquiat.....	Comox-Atlin.....				
Kyuquot.....	Comox-Atlin.....	A. Ellis.....	Nil	Nil	Nil
Masset.....	Comox-Atlin.....				
New Westminster.....	New Westminster.....				
Prince Rupert.....	Atlin.....	E. McCoskrie.....	288	300	234 00
Tofino.....	Comox-Atlin.....				
Vancouver.....	New Westminster.....	J. B. Campbell.....	4,890	4,248	3,719 40
Victoria.....	Victoria.....	Geo. Kirkendale.....	1,457	1,354	1,134 70
			6,635	5,902	5,088 10

## RECAPITULATION

	Seamen Shipped	Seamen discharged	Amount
Quebec.....	7,141	6,564	6,102 40
New Brunswick.....	1,715	1,440	1,314 50
Nova Scotia.....	7,017	5,783	5,505 90
Prince Edward Island.....	61	30	38 90
British Columbia.....	6,635	5,902	5,088 10
Total.....	22,569	19,719	18,049 80

## EXPENDITURE AND REVENUE

The parliamentary appropriation for the fiscal year 1920-21 was \$22,573,000, the expenditure \$20,603,112.55, leaving an unexpended balance of \$2,005,301.78, less overdraft of \$35,414.33, \$1,969,887.45. The net revenue was \$396,617.22.

## CORRESPONDENCE

The number of letters received during the fiscal year 1920-21 was 76,432, as against 74,995 in 1919, an increase of 1,437.

The number of letters sent out was 44,000, as against 42,500 in 1919-20, an increase of 1,500.

## SEASON OF NAVIGATION

At the port of Montreal the channel was reported clear on April 18, four days later than in 1919. The Government ice-breaker *Lady Grey* arrived from Quebec on April 18, and the ferry boat *Longueuil* on April 22.

The first ocean-going vessel, the *Canadian Aviator*, reached the port of Montreal on April 24.

The last vessel to depart for sea from Montreal was the *Benguela*, on December 6; the last departure in 1919 was on December 12.



SESSIONAL PAPER No. 21

## NEW LEGISLATION

During the parliamentary session of 1921 new legislation affecting the department was enacted as follows:—

Montreal Harbour Commissioners, Bill No. 77, assented to on May 3.

Canada Shipping Act (Public harbours), Bill No. 40, assented to on June 4.

Lake of the Woods and other waters, Bill No. 216, assented to on June 4.

## STEAMBOAT INSPECTION

The report of the Chairman of the Board of Steamboat Inspection is published as a supplement to the annual report.

A. JOHNSTON,  
*Deputy Minister of Marine and Fisheries.*



